EXHIBIT H

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF NEW YORK

UTICA DIVISION

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PHILADELPHIA INDEMNITY INSURANCE COMPANY A/SO/ BALDWIN REAL ESTATE CORP.,

Plaintiff,

-against-

KATHLEEN BURKE BARKER,

Defendant.

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HELD AT: Zoom Conferencing
November 11, 2020
Start time: 11:05 a.m.

EXAMINATION BEFORE TRIAL of JAMIE McALLISTER, Ph.D., expert witness, taken by the Plaintiff, pursuant to Notice.

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STIPULATIONS

IT IS HEREBY STIPULATED AND AGREED by and between the parties hereto through their respective counsel, that all rights provided by the F.R.C.P., including the right to object to any question except as to the form, or to move to strike any testimony at this Examination, are reserved; and, in addition, t he failure to object to any question or move to strike any testimony at this Examination shall not be a bar or waiver to make such a motion, and is reserved for the trial of the action;

It is further stipulated and agreed that the transcript of the testimony may be signed before any notary public or other officer authorized to administer oaths;

It is further stipulated and agreed that the filing and certification of the original of this Examination are waived.

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JAMIE McALLISTER, Ph. D., having been first duly sworn, testified as follows:

EXAMINATION

BY MR. ZIELINSKI:

Q. Could you please state your full name for the record, please?

A. Jamie Lynn McAllister.

Q. What's your date of birth?

A. October 22nd, 1977.

Q. And what is your current employment?

A. I am the owner of a company called Fire Tox, T-O-X.

Q. And how long have you owned that company?

A. For 3 years.

Q. And are you the sole owner or do you have any partners?

A. It's owned between myself and my husband.

Q. 50-50 split?

A. No. It's a 51-49.

Q. And who has the 51?

A. I have the 51. It's a woman owned business.

Q. Okay. And is it is an LLC? What type of business is it formally?

A. LLC.

Q. And what is the function and purpose of that

business?

A. We provide four core service areas, so we provide fire investigation, origin and cause, as well as post-fire reconstruction analysis. We also provide fire protection, engineering design services, construction inspections and commissioning. And then we work in the research arena, as well, primarily doing research -- fire research for federal entities in the United States and Canada. And then we also provide training to fire investigators, primarily the International Association of Arson Investigators chapters throughout the country.

Q. And how many employees do you currently have, other than you and your husband?

A. We have two other individuals that work for us, and they are on a part-time basis.

Q. Now, you did go through a number of things that make up the business. Is there one particular area that over the past 3 years has been the primary revenue source for the Fire Tox entity?

A. It's changed, because in the last year I went from doing this on a part-time capacity to a full-time capacity. Prior to this past year, we actually -- I did investigation work, still, under my previous employer, who is Combustion Science & Engineering. So

this year I would say it's a pretty even split between all of those four elements that I mentioned. Maybe not so much on the training, because it's COVID and it impacted that a little bit. But between the other three areas, research investigation and what I call traditional fire protection, it's about an even split.

Q. And I saw that overlap on your CV. And I'm not going to get too much into it. But just so there's a point of clarification, the Fire Tox has been around for 3 years. You provided your fire investigation service -- you performed fire investigation services for Combustion Science during 2 of those first 3 years?

A. Correct.

Q. And why was that?

A. That was the agreement that we had in place. When I left Combustion Science to go work for the Federal Government, I continued to work for Combustion on a part-time basis and continued to do fire investigation work with them. The agreement was that when I started my own business, we would primarily focus on training and research. And the opportunity came about to go in to this in a full-time capacity, and that was when we had conversations with Combustion saying Hey, we're now going to start shifting and doing this work under our own umbrella.

Q. How long were you affiliated with Combustion Science?
A. 20 years.
Q. And under Combustion Science what services did you provide over those 20 years?
A. Fire investigation. And they also do laboratory research, research and development, so the primary areas that I worked in with them was in working as a fire investigator, working on litigation cases and then also working as a fire researcher.
Q. And would you consider your time -- and I know it's 20 years, so it might vary from time to time. But would you consider your affiliation with Combustion Science to be part-time over that 20 years, given your role in working with the government in other areas? What would you consider that role to be, as far as employment?
A. So I was a full-time employee with them for 13 years. And then the remaining 7 of those years was on a part-time capacity.
Q. So it would have been the last 7 years?
A. Correct.
Q. And let's just briefly go through your education for me.
A. My Bachelor's is in fire protection

Engineering. My Master's is in fire protection engineering. And my Doctoral degree is in toxicology, with a focus on combustion toxicity and fire-related deaths and injuries.

Q. Just take me through the Bachelor's degree. Where did you obtain it and when?

A. So the Bachelor's was from the University of Maryland, College Park, and that was in 2000. And then the Master's was from the same university in 2002. And the Doctoral degree was from the University of Maryland School of Medicine in the Baltimore City campus, and that was in 2010.

Q. And that area of -- your doctorate was in what again? I'm sorry?

A. So the focus of the Doctoral degree, part of the program required me to do course work on all -- all things toxicology related. But the Doctoral dissertation work that I performed was with the office of the chief medical examiner, and that was focused on fire-related deaths and injuries and combustion toxicity and also looking at how drugs impact the ability of an occupant to escape from a fire.

Q. Okay. And just briefly take me through what your Master's was focused on.

A. So my Master's degree, again, was in fire

protection engineering. The general Master's level of that program covers advanced fire dynamics, so that would mean things like understanding the transfer, thermal chemistry, thermal dynamics, fluid flows, flame spread, the release rate. And then also the focus of my thesis in that particular program was electrically-initiated fires.

Q. And that was a 2 year program?

A. Yes.

Q. All right. And today -- what licenses or certifications do you have today, that you hold?

A. I am a certified fire investigator through the IAAI.

Q. When did you first obtain that?

A. I would have to look at my CV to be sure, but I think it says 2004.

Q. That's fine. What other certifications or licenses do you have?

A. I am a certified safety professional; that would have been within the last 3 years that I obtained. I also have licenses as a professional engineer in the State of Maryland and the State of Delaware. Those are what I would consider to be my licenses. Obviously, there's a lot of other types of certifications that are issued as a result of various

trainings that I've taken through the fire service. But those are the ones that I would consider are my licenses.

Q. Okay. Fair enough. Do you hold any New York licenses?

A. No.

Q. Do you hold any -- an investigator's license in the State of New York?

A. No.

Q. And you mentioned your fire -- your fire -- other related fire activities. Have you been involved, as a firefighter or worked as a firefighter throughout the course of your career?

A. I was actively involved in the fire service as a firefighter and emergency medical technician for 15 years, and I still continue to be involved in the fire service, but on the administrative side.

Q. Okay.

A. So positions such as like president or managing various committees, bylaw committees, grant committees in support of the fire department.

Q. And has it been the same fire department throughout your career?

A. No. I started as a firefighter in Pennsylvania.

Q. Where was that?
A. In Colmar, C-O-L-M-A-R. When I went to the University of Maryland for my degree, I then transferred to Beltsville Fire Department, which is in Prince George's County. B-E-L-T-S-V-I-L-L-E. I also -- so within Prince George's County there are a number of different departments. So I was at -- I've been at three different departments, one on the northern portion of the county, one in the central portion of the county, and then the current department I'm with and have been with for, I think, somewhere on the order of 12 or more years, probably close to 15 years, is on the southern portion of the county, which is Morningside.
Q. And before you got in to the administrative role, you said you had approximately 15 years of fire service. Would that be firefighting, serving as a firefighter?
A. Yes. So I served as a firefighter. I served as a driver operator. I was a lieutenant. I'm trying to think if there were any other assigned roles besides them. Those are mostly the assigned roles that I had.
Q. You said you were also an EMT?
A. Yes.
Q. During those 15 years of fire service, were

you also -- tell me about the EMT and how that coincided with the fire service work, if it did at all.

A. So we're required within Prince George's County to be both firefighters and EMTs. Even if you join the fire department only wanting to be a firefighter, the county requires you to obtain your EMT certification. So in some cases that means that I would be riding on both the fire apparatus, as well as ambulances as needed. At Morningside the majority of the time that I was there, we did not have an ambulance, but we still were required to respond to emergency medical calls, if we were the closest unit available, which meant that we provided emergency medical treatment on the scene in advance of an ambulance arriving to transport the patient.

Q. So would it be a fair assessment to say that you were an EMT and you functioned as an EMT within your duties within the fire department? Is that a fair assessment?

A. Yes.

Q. Okay. And I know this is going to be difficult to quantify, so I'm obviously asking for an approximation or estimation. Approximately how many fires have you responded to in your career as a firefighter?

A. I would say on the order of thousands. I don't know -- I couldn't, probably, put an exact - you know - how many thousands. But I would say on the order of thousands.

Q. And in that time as a firefighter or within your role within the fire department, did you ever perform fire investigations on behalf of the fire departments?

A. No.

Q. Doing that role as a firefighter, would you ever be in a position to interview witnesses and observers of fires?

A. There would be times where we would have conversations with individuals after the incident, to try to better understand what happened. But that's not within the context of performing any type of official investigation. One of the things that we are required to do in the fire department is we're required to fill out incident reports that identify what the potential cause of the fire might be. It's different than what the jurisdictional investigator's responsibility is. So that's kind of why there's some level of an inquiry involved. But not interviewing for the purpose of performing the official investigation.

Q. Fair enough. As you sit here today can you

quantify how many fires that you responded to as a firefighter, that the suspected cause was a suspected cigarette or smoking materials?

A. Gosh. I think I would be guessing if I gave you a number.

Q. Certainly the answer would at least be multiple times that that occurred in the thousands --

A. Sure.

Q. -- of the times that you responded to fires?

A. Yes.

Q. Would the same hold true for smoldering fires, weather smoking materials be the cause or not, but have you responded to fires which you understood witnesses or observers to believe that the fire smoldered before it manifested itself?

A. Yes.

Q. Are you able to quantify in any way how many times that -- how many times you experienced that situation, as a firefighter?

A. I wouldn't be able to with certainty.

(Internet interruption)

Q. In your time as a firefighter, did you ever have experience with taking actual witness statements to those individuals that may have witnessed or involved in a smoking-related or

smoking-material-caused fire?

A. No.

Q. And how about the same question with regard to speaking to witnesses or observers, in your firefighting capacity, for individuals who would have been describing a fire that may have been caused with a smoldering effect?

A. It wouldn't have been in an official capacity, no. Not taking witness statements in an official capacity.

Q. And fair enough. I quantify that by making it sound more formal with regard to statements. But how about, from causally speaking to those while performing fire suppression or involved in fighting a fire, were you able to speak with individuals who may have discussed how smoking materials may have led to a fire?

A. I don't have a specific recollection. But like I said before, it's not uncommon for those types of conversations to occur after the event, when everything has been put out, people are standing around outside providing information about what they saw, what they did, what they heard. I don't have a specific recollection of that, though.

Q. Moving more to your investigative or your

forensic career. How long would you have considered yourself to be involved in -- as a forensic fire investigator? How many years?

A. 20.

Q. And approximately how many fires have you investigated during those 20 years?

A. Probably -- I think probably somewhere in the order of 600.

Q. Okay. And in this instance -- obviously it's a situation where you're basically reviewing a file that was provided to you, correct?

A. Correct.

Q. How many of those 600 involve this type of review, where you were reviewing someone else's conclusions and rebutting them?

A. Well, I think the majority of all of that would include that. I'm not sure if you're saying how many involved me going to the scene versus reviewing case files or --

Q. That's one way to phrase it. How many times -- how many of those -- would you include situations like this, reviewing the file, where you didn't go to the scene, as one of those 600 fire investigations?

A. Yes.

Q. How many would fall under the category, the situation that you were sitting in today for this case?

A. I would say it's probably somewhere in the order of a 50-50 split between when we actually have the opportunity to go to the scene versus instances like this, where it's after the scene has already been demolished and we're, basically, reviewing a file.

Q. So you would say about 300 of those 600 would be -- and again approximately -- would fall under the category of file review as opposed to going to the scene?

A. Correct.

Q. And would it be fair to say that the majority of those -- in those instances that you would be -- would have been retained by the defense involved in that case?

A. That's an interesting question. No. I mean, I think that our work tends to be kind of in a 50-50 capacity as well, as far as the split between plaintiffs and defendants. So even on the plaintiff side, I've had cases where they've come to me later, so they may have had somebody and then realized we need to have an engineer do this, look at this, do these calculations and come to me after the scene is no longer available. So it tends to be about a 50-50

split for us between plaintiff and defendant.
Q. And I understand you have multiple, different areas of focus within the fire -- within the fire investigative field. So when you say you're brought in as an engineer, are you talking about a fire protection engineer?
A. It could be -- so I should say it could be me looking at something from the perspective of fire protection hearing. It could also me be looking at something in the perspective of forensic toxicology where Combustion Science is -- it depends on the case.
Q. Of the files that you received to review as opposed to going to the scene, were you ever retained to dispute or determine origin and cause?
A. Yes.
Q. Again, are you -- and I know this is difficult. Are you able to determine of those 300 approximately how many fall under that category?
A. Gosh. I mean, my inclination is to say more than less that we're looking at it more globally and not just looking at one particular issue. But I don't know that I could give you a percentage breakdown with any confidence.
Q. In this case who retained you in this case?
A. We were retained by Mr. Casey's firm.

Q. Do you know who Mr. Casey is working for in this instance?
A. My understanding is he represents Ms. Barker.
Q. And are you aware of who the insurance carrier is?
A. I do not recall at the moment.
Q. If I told you it was Erie and Niagara, would you recognize that name?
A. That sounds familiar, yes.
Q. Prior to this case, had you ever performed any forensic work for Erie and Niagara Insurance?
A. I don't recall anything for Niagara. Erie I definitely -- I'm fairly certain over the years, because they're a large insurance company that --
Q. Actually, I'll stop you there for a second. The name of this company is Erie and Niagara. It's separate from Erie. It's separate from Niagara. Just to be clear. I was specifically asking about Erie and Niagara Insurance Company.
A. I do not have a specific recollection of doing any work previously for them. It's always possible. But that's not really how we track our casework. We track it based on the law firm, not the insurance company.
Q. Had you ever worked for Mr. Casey prior to

this?

A. I recall one previous case that I worked with him.

Q. And how about Mr. Casey's firm?

A. Not that I'm aware.

Q. And was that a fire-related matter?

A. Yes.

Q. And how many times have you been deposed as a forensic fire investigator?

A. I believe that I have had 17 depositions.

Q. So you've had -- and I guess -- I just want to break this down a little bit more. You've had 17 depositions as an expert?

A. Yes.

Q. And I know you also have experience with the toxicology aspect of things. So I want to quantify how many of those 17 depositions involved, let's start with, a conclusion relative to a cause of a fire?

A. I am not sure what it would be. Probably more of those are related to fire than combustion toxicity. I mean, as a fire expert, I group them all under fire, because even in the carbon monoxide cases, I've -- resulting from combustion.

Q. Right.

A. But I think based on what I understand you're

asking, I would say more so than less. Without having a list in front of me, I can't give you an exact number.

Q. And so under the -- what you would view as the toxicology aspect of things -- and I may be speaking in unlike terms, so you can correct me if I'm wrong. But the toxicology-type matters would be cases that involve inhalation of smoke, carbon monoxide, things of that nature? That's what you would quantify or qualify as a toxicology-type matter?

A. Right. So it could be anything from combustion -- it could be from exposure to products of combustion related to carbon monoxide; it could be a fire case where I'm looking at both origin and cause and also looking at the impact that drugs and alcohol may have on a victim, or looking at the exposure of products and combustion from what we call unwanted fires impacted the victim.

Q. And when you're typically retained, you said you keep track as the name of law firms. Are you generally contacted by law firms for the type of work you just described?

A. Yes. That's the primary point of contact, yes.

Q. And some of those do involve personal injury

claims as well, correct?
A. Yes.
Q. Have you ever been -- have you ever given -- have you ever been qualified as an expert to give testimony at a trial related to any fire-related topic for which you were retained?
A. Yes.
Q. How many times?
A. I've gone to trial 5 times.
Q. And can you take me through, generally, those 5 -- those 5 matters and what you were retained and what your opinions were?
A. The ones that are relevant to your question or for all of them?
Q. Well, of the 5, how many times were you reaching an opinion with regard to a fire's cause and origin?
A. So my recollection is one of those cases was revolving around the potential ignition of a wheelchair. There was a case I had that was -- which revolved around the ignition of wood shavings at a manufacturing plant. Now I'm trying to think what the -- oh. There was a conviction criminal case that I was involved in, which had to do with origin and cause and looking at the kind of products of combustion the

scene was exposed to, based upon the proposed origin and cause of the fire. There's 3. The other 2 are unrelated -- one was a carbon monoxide poisoning incident. The other was actually related to a fire-service-injury incident.

Q. Fair enough. And I appreciate the quick summary. With regard to the ignition and the wood shavings, what was your testimony -- what were your conclusions in that case?

A. Now, you're asking me to reach into a hole that --

Q. And I certainly understand if -- if you can recall.

A. I recall that it revolved around whether or not there was self-heating. As a result of the wood shavings, it had to do with the origin of the fire. There were calculations that I did for revolving around flame heights coming off the wood shavings. It's been quite a while. I don't really --

Q. Were you -- do you recall whether you were representing the plaintiff or the defendant in that matter?

A. We were working for the defendant in that matter.

Q. With regard to --. Strike that. We started

to go down the path of who you were retained by in this case. And you said that it was Mr. Casey, is that correct?

A. Yes.

Q. In your investigation of this case, have you dealt with any other investigators or contacts, other than Mr. Casey, for the defense aspect of this case?

A. Can you rephrase it? Because I'm not exactly sure what you're asking.

Q. Have you dealt with any other individuals, other than Mr. Casey, with regard to this matter?

A. No.

Q. What was your understanding of the scope of your retention? What were you retained to do in this case?

A. To review the case file, to review the reports that had been produced and to determine whether I could come to any conclusions about the origin and cause of the fire.

Q. Do you recall when you were first retained, what the date was?

A. It would have been this year. I don't know exactly, only to say it was probably somewhere within the late end of the first quarter, maybe the beginning of the second quarter of this year.

Q. And what did you do with regard to preparation for today's deposition?

A. I went through the conclusions within my report - and there are a few calculations that I believe were produced to you - that I performed in response to Mr. Vieau's rebuttal report. Generally went through and reviewed the documents that I had produced as part of my file.

Q. You mentioned calculations in response to Mr. Vieau's report.

A. Rebuttal report.

MR. ZIELINSKI: Off the record.

(Discussion off the record)

EXAMINATION (Continued)

BY MR. ZIELINSKI:

Q. So you reviewed calculation that are in your notes, that are were produced and that we'll mark towards the end of this deposition. What else did you review?

A. I think I mentioned my report. I went back and looked at some photographs and Mr. Vieau's report as well.

Q. What else, if anything, did you do in preparation for today?

A. I have a summary document that summarizes my

notes from the depositions; I reviewed that as well.
Q. Are those notes in your file?
A. Yes.
Q. And when you -- with regard to the depositions, did you read -- you've read Mr. Vieau's deposition, is that correct?
A. Yes.
Q. And you've read the deposition of all of the fire officials --
A. Yes.
Q. -- that testified in this case?
A. Yes.
Q. Is there anything that would be in your file, that was not provided to Mr. Casey to be provided in this case?
A. No. The only thing I have is, obviously, the cigarettes.
Q. We'll get in to that a little bit later. Other than the cigarettes, what else would be considered part of your file, if anything, that wasn't provided?
A. Nothing else.
Q. And do you only maintain a hard file?
A. No. The majority is electronic.
Q. Actually that was a poor question. Do you

only maintain an electronic file?

A. Most of it is electronic. I kind of print stuff out, depending on -- sometimes when I'm preparing reports, it's easier to have the diagrams in front of me or certain photographs in front of me, so I may choose to print some photographs. My report is printed out. My summary is printed out. And then obviously I have written pieces of paper too.

Q. Okay. Do you know who Michael Seidel is?

A. I don't recall of the top of my head, no.

Q. You don't recall speaking with a person named Michael Seidel of Seidel Claim Services? Perhaps I'm pronouncing it wrong. S-E-I-D-E-L.

A. No, I have not spoken to him.

Q. Okay. And he was the individual that went and obtained the cigarettes, based on the information that we received.

A. Correct. So that's probably why his name looks familiar to -- or sounds familiar to me. But I've never spoken to him directly.

Q. Okay. And with regard to the tests that we'll talk about, do you recall whose idea it was to perform testing on the cigarettes?

A. That was my idea.

Q. And did you ever have any conversation with

Mr. Seidel about where to go or how to obtain them or how to get them to you?

A. No.

Q. And it's your recollection, now that we've said his name and identified who he is, that you never spoke to him directly?

A. Correct.

Q. Did you ever correspond with him?

A. No.

Q. Is it your understanding, and I'll do a poor job of pronouncing this, that Ganienkeh, G-A-N-I-E-N-K-E-H, Reservation in Altona, New York, do you know why that specific location was identified for the purchase of the exemplar cigarettes.

A. I do not.

MR. CASEY: He said the name of the reservation and then he said exemplar cigarettes.

Q. Did you ever talk to Kathleen Barker as part of your investigation?

A. No, I did not.

Q. Did you ever talk to Brian Wydra, W-Y-D-R-A?

A. No.

Q. Did you ever speak to a person named Bill Haynes?

A. No.

Q. Did you ever speak to any of the fire investigators from Lewis County that were deposed?
A. No.
Q. Is your investigation in this case strictly limited to, for lack of a better term, the paper review of this file?
A. Yes. I mean, I reviewed -- reviewed what was provided to me, reviewed the literature, performed the tests that you're aware of, but did not speak to any of the people that were deposed in this case or wrote reports.
Q. The cigarettes that were purchased, there were 4 cartons purchased. Was that at your direction, the amount of cigarettes purchased?
A. No.
Q. And do you know what type of brand these cigarettes were?
A. They're called Rollies brand. R-O-L-L-I-E-S.
Q. And do you know where they're manufactured?
A. I do not.
Q. Do you know how they're manufactured?
A. No.
Q. Do you know if they're manufacturing process is -- would -- produces identical cigarettes - you know - over the course of months of different runs of

the product?
A. I do not.
Q. Were you able to confirm that the cigarettes that were purchased by Mr. Seidel were the same cigarettes or were the same brand cigarettes that were smoked by Ms. Barker on the day of the fire?
A. That is my understanding.
Q. How did you get that understanding?
A. Based off of Ms. Barker's deposition testimony, it's my understanding that the cigarettes that were purchased were the exemplar cigarettes, the ones she smoked on the day of the incident.
Q. What about her testimony made you have the understanding that they were similar to what was then purchased at this Indian Reservation and mailed to you?
A. The location that she purchased them from -- or that her friends purchased them from, I should say, and the information that Mr. Casey had represented to me.
Q. And do you recall in her deposition that Ms. Barker essentially stated that the cigarettes came from her friend who purchased them at the Plattsburg Indian Reservation, is that correct?
A. That's correct.
Q. Do you recall in her deposition testimony her

saying anything about the Ganienkeh Reservation in Altona, New York as the location for where the cigarettes were purchased?

A. I do not.

Q. Sitting here today, other than the affirmation by Mr. Casey, do you have any other information or support to confirm that the cigarettes were similar or identical to the ones Ms. Barker smoked on the day of the fire?

A. I do not.

Q. Are there any cigarettes -- like I said, we'll get into the testing later. But are there any left over cigarettes -- exemplar cigarettes from the testing you performed?

A. Yes.

Q. Do you know how many of the 4 cartons, how many cigarettes remain?

A. We would have tested -- I believe out of that, there was only -- let's see. We did replicates of 3 for each test, so that's 6, and I believe 1 or those -- or 2 of those were used for dissection photographing.

Q. So there would be a lot left then, fair enough?

A. Yes.

Q. At least 2 cartons, correct?
A. Correct.
Q. And where is that now?
A. In my possession.
Q. Whose -- the test itself that was performed and the scope of it and exactly what was done, whose idea was that?
A. That was mine.
Q. And where were those tests performed?
A. We have a garage facility in my home where I run my business that is dedicated to our investigation equipment and evidence storage.
Q. When did you perform that test?
A. It was actually over a weekend. I don't have the exact date.
Q. Would that be in your notes anywhere?
A. It might be on the pictures, actually, on my phone. I want to say it was September. Let me just look at my calendar.
Q. Actually, I was just looking through the invoices that were provided with your notes, and it says Analysis Testing on September 27th.
A. Right.
Q. That coincides with your notes and the photographs?

A. Correct.
Q. Do you recall how long the test took you to prepare, set up, complete?
A. Somewhere around the order of an hour.
Q. And when you perform this testing, had you reviewed all of the deposition transcripts -- well, strike that. Had you reviewed the Lewis County Fire Department report?
A. Yes.
Q. Had you reviewed Daniel Vieau's fire report?
A. Yes.
Q. Had you reviewed the fact witness depositions that were taken to that point?
A. Yes.
Q. Why did you determine to -- why did you conclude that this was the test that needed to be performed?
A. So the purpose of this test was simply to share that these particular cigarettes aren't unique in any way with regards to what the literature reports as the ranges for burning rates for cigarettes. So it was essentially taking what the literature and Dr. Krasney and his comprehensive report on cigarette burn rates, looking at those values and then essentially just verifying that these particular cigarettes had nothing

unique about them that would cause them to be grossly outside of the burn rates that are reported in the literature.

Q. And is the reason you wanted to confirm that because these were Rollies brand as opposed to a more commercially available brand?

A. Well, we don't -- we didn't know if they had any type of fire safe cigarettes aspects or characteristics. Not necessarily because they were any particular brand. But potentially just to show that they behave in the same way that other cigarettes that have been characterized.

Q. So this was -- if Ms. Barker had testified that she had smoked Marlboros or Marlboro Lights, would you have performed the same test?

A. Yes.

Q. And why is that?

A. Again, just to verify that that brand of cigarettes and that particular length of cigarette, diameter cigarette is within the ranges that are reported in the literature.

Q. Prior to this testing, throughout your career, had you ever performed any cigarette-related tests?

A. Yes.

Q. And how many times?
A. I can recall a handful of times where I looked at the potential for cigarettes to ignite polyurethane foam and doing experimentation related to placement a cigarette within crevices versus on top of cushions. I recall some testing that was done regarding the ability to cigarettes ignite in gaslone pole (sic) fires. Those are the ones that come to mind. There may be others.
Q. Were these tests done related to specific fire investigations that you were retained on?
A. Yes.
Q. And so let's work backward. You said that you were testing the ability for the relationship between gas and cigarettes? Is that one of the tests?
A. Yes.
Q. What were you trying to accomplish in that test? Or what were you trying to determine in that test?
A. Whether the cigarette was the competent ignition source.
Q. And can you just generally take me through what you did?
A. I mean, this is several years ago. My recollection is there was a pan that was -- when I

worked at Combustion, we have a combustion laboratory, we use a hood, placing a pan under the hood and essentially putting the cigarette into the pan, determining whether it was capable of causing ignition of the vapor coming off the gasoline.

Q. And were you able to achieve any ignition?

A. No.

Q. And in that case what were -- were you retained to rebut another expert's contention that ignition could be achieved by putting a cigarette in gasoline?

A. I honestly don't remember all of it. I mean, this would have been over 10 years ago, if not longer; I don't remember all of the reasons why we were doing the test. I just remember doing the test.

Q. You also said that you dealt with testing regarding the placement of cigarettes on certain surfaces and crevices, is that correct?

A. Correct.

Q. How long ago was that?

A. Probably around the same, 10, 15 years ago.

Q. Would that have been a different case than the gas testing case?

A. Yes.

Q. And do you recall what your purpose for

performing this test was?

A. There was an issue as to whether or not the cigarette that could have been laying on top of a cushion was capable of igniting it or whether or not it had to roll into the crevice in order for ignition to occur.

Q. What did your testing determine?

A. The crevice orientation is -- the crevice -- for the crevice of the couch, the area between -- in this particular case it was the arm of the couch and the couch cushion -- was necessary in order to be able to get ignition to smoldering combustion to develop.

Q. And just briefly, so we can talk like terms, when you say smoldering combustion, what does that mean to you?

A. So non-framing combustion essentially. So you've got smoke production, there is an area that is polarizing, the material is burning, but at a very slow rate and there's no visible flame present.

Q. And when you performed the testing that you were describing, did you attempt to determine if the cigarette would ignite simply laying on the surface?

A. Yes.

Q. And you said your conclusion was that it would need to be in the actual crevice in order to

result in ignition, is that correct?

A. Correct.

Q. And when you reached that determination, why were you -- what was your conclusion with why the crevice resulted in ignition?

A. What ends up happening during the smoldering process, specifically with polyurethane foam is that the foam tends to essentially melt away from the cigarette. So you need to have some type of orientation that would allow for heat to be contained, which is what you get when you have it, basically, in a crevice orientation. Heat is able to be contained and there's a low enough heat loss that it allows for that smoldering to sustain and eventually transition to framing combustion.

Q. And essentially acts as an insulator for the cigarette to smolder, correct?

A. Correct.

Q. The other testing that you did -- and my notes will be poor on the first one that you described. Do you recall the first testing you said that you performed, other than this one and other than the 2 that we discussed, related to cigarettes?

A. I think -- I'm not exactly sure I understand the question. What I would have --

Q. I think you said that you listed 3 different tests, that you recall, that you performed. I was working backwards, and my notes on the very first one are poor. We just described the crevice test, the gasoline test. Is there any other test that you recall performing, relating to cigarettes, other than the ones you did in this case or the ones we discussed?

A. No.

Q. With regard to the testing that you performed in this case, the results that you ultimately received, were they what you had anticipated before performing the tests?

A. Yes.

Q. And why did you anticipate such a result?

A. Based on the literature.

Q. And what literature are you referring to?

A. So there's -- within Chapter 19 of the SFPE Handbook, there's information regarding smoldering -- I'm sorry -- burning rates for cigarettes. And then also the article I cited Krasney - it's K-R-A-N-S-E-Y - provides a lot of data related to burning rates from cigarettes -- hundreds OF cigarettes from various countries across the world.

Q. With regard to your career as a fire investigator, have you determined -- have you ever

determined that a -- that A cigarette was the cause -- was a cause of a fire?

A. Yes.

Q. Approximately how many times have you reached that conclusion of the -- approximately 600 cases that we've mentioned you've been involved in?

A. I couldn't tell you with any certainty. I mean, I can think of a few cases that were fires as a result of cigarettes. I can't tell you with any certainty how many of those 600 it would be.

Q. And of the few that you -- that you don't know how many, but you know that you, at least, reached that conclusion, did any of them involve a period of smoldering before the fire manifested?

A. Yes.

Q. Do you know how many?

A. The 2 that I'm thinking of, that involved couches actually, and there were a few that I'm thinking of now that involved mattresses, and in those particular instances there were smoldering periods.

Q. Do you have any general idea of what the -- the general length of those smoldering periods were?

A. I don't remember for those specific cases. It can be - you know - on the order of 45 minutes to an hour. I don't remember those cases specifically.

Q. And do you ever remember any smoldering cases involving cigarettes having a smoldering time beyond 2 hours?

MR. CASEY: Object to form.

A. None that I -- that come to mind, no.

Q. With regard to -- I know we talked about smoldering fires related to cigarettes. Have you ever been involved in any other fires that involved a period of smoldering in which the cigarette wasn't the likely cause?

A. Yes.

Q. Provide some examples, if you can, of what smoldering fires you've been involved with, that had other causes and what those causes were?

A. The ones that come to mind are disposal of oily rags. There's one that I'm thinking of that involves fine aluminum shavings. So these would be - you know - materials that are capable of self-heating, that start as a smoldering process and then eventually transition to flaming.

Q. All right. And you mentioned that shavings case previously -- the wood shavings case, correct?

A. Correct.

Q. Would that fall under one of those type fires that involve smoldering?

A. I remember doing flame height calculations for that case. I don't believe -- I don't know whether or not the issue in that case was regarding the onset of some sort of biological process in the shavings. I don't believe it was, because they were just straight wood shavings. It wasn't anything to have any type of material in it, from my recollection.

Q. With regard to those smoldering fires -- and I understand they differ differently than potentially a cigarette fire -- but have you experienced with oily rags and the ultimate combustion that comes from them, that they process smoldering times in excess of 2 hours?

A. I don't recall any cases where we've had anything in excess of 2 hours for smoldering.

Q. With regard to -- have you come across any literature that speaks to the ability of cigarette fires or fires believed to have started with a cigarette to smolder past and beyond 2 hours, given certain conditions?

MR. CASEY: Object to form.

A. Beyond 2 hours?

Q. Yes.

A. That I'm not familiar with, no.

Q. Why don't we go ahead and mark your report as

Jamie McAllister -- as Dr. McAllister 1.

MR. CASEY: Can we take a short break?

MR. ZIELINSKI: Yes. If we're going to take a break, just because I've gotten three calls from the same person, so can we make it 10 minutes?

THE WITNESS: Sure.

MR. CASEY: Yes.

(Whereupon, a recess was taken)

EXAMINATION (Continued)

BY MR. ZIELINSKI:

Q. Okay. Back on the record. We're marking Dr. McAllister's Fire Tox report as Exhibit 1.

(McAllister's Exhibit 1
marked for Identification)

Q. And, Dr. McAllister, this is your expert report that you submitted on September 29th, 2020, is that correct?

A. Correct.

Q. And I just want to take you through some of your conclusions. You're obviously familiar with this. We can go through some of the details. I first want to talk about the area of origin. You do not disagree with Daniel Vieau's conclusion that the fire originated in the rear patio, behind garages A and B, is that

correct?
A. Correct.
Q. And with regard to your conclusion as to the area of origin, when you say patio, what do you mean by "the patio"?
A. So it would be the entire patio area. Because the footprint essentially is the concrete area, including the overhang structure above it.
Q. When you say patio, you're not limiting it to the ground level in and around the patio?
A. No.
Q. And why is that?
A. Because there's electrical components or electrical lighting and wiring that travels through the roof structure of the patio as well.
Q. And it's your -- do you have knowledge today that those switches or lights were on at the time of the fire?
A. No. Not that's documented.
Q. And do you know during the time of this fire or that this fire was daylight, correct?
A. Correct.
Q. If those lights were not on at the time of the fire, would you be able to eliminate them as to the cause of the fire?

A. The light itself?
Q. If the florescent light was not on -- I'm sorry -- the -- if the lights that were in that area, that weren't on, meaning they weren't turned on at the time, would you be able to eliminate the fixtures as the cause of the fire?
A. Yes. But there's wiring -- the problem is, we don't have the documentation of the wiring running through that area. So there's wiring -- my understanding from Mr. Vieau's inspection and testimony about the circuits having tripped in the garage area, is that there's wiring running through that area, that may not even have been associated with the lights.
Q. And when you say "wiring running through that area," what do you mean by that area?
A. The area above the patio. So the roof structure above the patio.
Q. And I guess my confusion is, where did you get that there was wiring for other items in that area, other than running to the lights that we're talking about? Did that come from Mr. Vieau's deposition, Mr. Vieau's report?
A. His deposition testimony.
Q. So when you wrote the report that we've marked as Dr. McAllister Exhibit 1, you didn't know

about that? You didn't know about the potential for other wiring to be in that area?

A. Correct. I mean, the fact that it's connected to the garage and there is a circuit tripped, leads me to believe that something traveling through that area most certainly could have gone through there and that could be why it was tripped. But clarity on that issue came from Mr. Vieau's deposition.

Q. What is your recollection of what Mr. Vieau said in his deposition with regard to that specifically?

A. That there was sound wiring above that area, that they attempted to trace it as best they could, and it seems to me that he deferred to Mr. DeMatties with regards to more specifics about the electrical wiring and damage to it. D-E-M-A-T-T-I-E-S I believe is the spelling.

Q. And were you aware that in Mr. Vieau's opinion that he was able to eliminate the area above the patio, meaning the overhang, based on examination of the florescent light, as well as the burn patterns in or around the surface area of the patio?

A. That's my understanding, yes.

Q. And you disagree with that assessment, given that you are unable to review the associated wiring

that was in the roof area of the patio?

A. What I disagree with is the opinion that one can effectively evaluate electrical wiring on the fire scene, conclude that because they did not see evidence of a bead with their eyes, that that then means that the wiring was not involved in the fire. As Mr. Vieau testified to in his deposition, laboratory analysis is necessary in many cases in order to be able to actually see evidence of arcing. So the position that I'm -- unfortunate position that I'm in is that I don't have that evidence to look at, the laboratory.

Q. But it's your understanding that if the lights were not energized at that time, that you would not find --. Or strike that. Strike that. With regard to -- with regard to your testing -- let's go down to your testing.

A. Okay.

Q. And I believe your testing starts on -- the description of your testing starts on page 9. Specifically take me through, just briefly, what you did with regard to your test.

A. So the cigarettes were tested 3 cigarettes, so we could get an average burn rate for each scenario. One was performed under conditions of pre-connection, which is essentially where the cigarette is in open

area, the winds that day were calm, so there wasn't any contribution where we could have gotten escalated burn rates as a result of wind or forced conduction. The cigarettes were lit with a lighter held at the tip of the cigarette for 5 seconds, then that was taken away, and the burn rate was essentially recorded from the time that the cigarette -- the lighter was removed until the cigarette was extinguished. That was done for the open air. The second set of tests were looking at what happens when some sort of a substrate is placed on the cigarette which will block the ability to entrain air in its circumference and will cause heat to dissipate from the cigarette to the substrate. The literature shows that when cigarettes are placed on the substrates you can get longer burning rates, so we were interested in looking at what those longer durations of burning looked like. Those again were performed on 3 cigarettes so we could get an average burn rate. And that essentially is that test.

Q. And when we're testing the burn rate for open air, under the circumstances of this fire, why was open air a test that you showed?

A. To get a range to show that based -- again, the purpose of these tests is not to replicate what occurred on the day of this incident. The purpose of

the test is simply to show that we can rely upon the values within the literature and the rates provided within the literature. There's nothing unique or different about these cigarettes compared to any other cigarette that you can go out and buy.

Q. So you're essentially saying that the test was done to verify -- so -- in order to conclude that other previous tests on cigarettes were -- could be used as similar or related, because these cigarettes did not differ from previously tested cigarettes?

A. Right. I mean, to be perfectly blunt, if I had simply relied upon the literature and the hundreds of tests that have been done to categorize burning rates, then I likely would have been asked how I know that those apply to this particular cigarette. So in order to evaluate that, we tested this particular brand of cigarette and showed that it very well falls within the ranges; nothing unique or different about this cigarette than any other cigarette.

Q. So it's your testimony that it wasn't meant to replicate the way that Ms. Barker deposed of the cigarette on the day of the incident?

A. Correct.

Q. So the fact that you didn't perform any testings -- any testing with half bent cigarettes is --

that's the reason why you didn't perform that type of testing?

A. Correct.

Q. Did you ever consider trying to replicate the smoldering situation on the back porch, that was testified to in discovery?

MR. CASEY: Object to form.

A. No.

Q. Why not?

A. I did not feel that we had a sufficient level of detail with regards to the specific type of planter, to be able to know exactly how to replicate that.

Q. Did you know what -- sitting here today, do you know what type of planter was on the back porch?

MR. CASEY: Object to form.

A. We know that it was plastic. I believe the testimony was that it was 6 inches in diameter. Mr. Vieau indicated that it was polypropylene. I'm not sure what the basis is for that. But other than those things, no, I don't -- I don't know anything beyond that.

Q. In reaching your conclusions in this case, what was your analysis or understanding as to what was in the planter at the time of the fire?

A. The testimony provided by Ms. Barker was that

there was approximately 1 inch of cigarettes in the bottom of the planter.

Q. Did you factor in that Investigator Croneiser testified that Ms. Barker told him on the day of incident that there was dirt in the planter?

A. I did consider that as well. Whether it's 1 inch of cigarette butts or whether it's dirt, does not change anything with regards to my opinions.

Q. In your report did you mention anywhere the potential that there could be dirt in the planted pot, as testified to by Deputy Croneiser?

A. Yes. On page 5.

Q. You said - I'm sorry - on page 5?

A. Yes. Second paragraph, there's -- second paragraph, second to last sentence. I'm sorry.

Q. "More specifically, Deputy Croneiser testified that Ms. Barker wiped the cigarette in the dirt, in the planter and then shoved it into that same dirt"?

A. Correct.

Q. So when reaching your conclusion, you didn't just factor in that there were cigarettes in the planter, but also cigarettes in dirt?

A. Correct.

Q. How did you reconcile, if in any way, the

conflicting testimony of Ms. Barker in regards to the contents of the plastic pot?

MR. CASEY: Object to form.

A. I don't consider the testimony to be conflicting. Ms. Barker testified that there was an inch of cigarette butts. The information provided by Deputy Croneiser is not Ms. Baker's testimony. It is his testimony about what he believes Ms. Barker said. It is possible that he misunderstood her. I don't know why there is a discrepancy. But as I mentioned, it doesn't matter whether it's an inch of cigarettes or it's dirt with regards to the timeline of events; it doesn't change anything.

Q. And it's also possible that Deputy Croneiser's recollection is accurate, in that Ms. Barker has changed her story or her testimony differs?

MR. CASEY: Object to form.

A. That is possible, yes.

Q. Why do you, in reaching your conclusion, choose to conclude as to the former as opposed to the latter?

MR. CASEY: Object to form.

A. I think I just stated I considered both, and neither one of those scenarios leads to anything

different with regards to my conclusions.

Q. And is it also fair to say that in assessing whether to completely eliminate the possibility of smoldering a cigarette as the cause of the fire, that the dirt mentioned here could also have been misidentified as potting material or other typical soil that you find inside a potted plants?

MR. CASEY: Object to form.

A. I don't have any information in anybody's testimony that it was potting soil. I have --

Q. Well, when you -- I'm sorry.

A. I have information that it was dirt, according to Deputy Croneiser, or nothing.

Q. So when you see the term -- you would agree with me that there's a difference between dirt and potting soil, correct?

A. Correct.

Q. And would you agree that from a smoldering scenario, in the determination of a potential cause of a fire, that they would have different characteristics that may result in different outcomes? Is that a fair assessment?

A. Yes.

Q. And that smoldering -- a smoldering fire -- and I understand that you dispute that cigarettes are

unlikely to be the cause. But it is more likely to have a smoldering cigarette fire in potted soil than you would in a pot filled simply with dirt?

A. You wouldn't -- I mean, if you're indicating that the dirt would be the ignition source, the dirt can't burn. Anything that's 80% more mineral content doesn't burn. Unless we're talking about the butts themselves. Yes, the potting soil is combustible and can catch on fire.

Q. And dirt, you would say, would not?

A. Correct.

Q. Did you ever consider in your analysis of this fire that the dirt referred to could, in fact, have been potting soil?

A. No, because I have no evidence to suggest that potting soil was involved.

Q. What was your understanding of the weather on the day of the fire?

A. I believe it was -- I think I may have actually included it in my report. Maybe mid 50s and maybe -- I'm sorry - 7-mile per hour winds, I believe what was indicated in the local jurisdiction report. I don't think I put it in my report, but I recall reviewing it in the Lewis County documents.

Q. What, if any, environmental factors did you

consider in reaching your conclusion?

A. Which particular conclusion?

Q. The conclusion with regard -- actually, why don't we head down to your -- why don't we head down to your actual conclusions.

A. Okay.

Q. I believe they -- Summary of Opinions start on page 16. Perhaps it's probably better to work through those before we get to that actual question. I'm going to start with the fourth -- fourth dot, the fourth paragraph. You say "Based upon testing of Exemplar cigarettes, the incident cigarette would have self-extinguished after 9 minutes."

A. Right.

Q. What do you base that on?

A. So the range within the literature that shows that the lowest average -- or the lowest burn rate for a cigarette is 4 millimeters per minute, and the testing that was done shows that this particular cigarette, when it is placed on a substrate, which causes it to have a smaller burning rate, produces almost equivalent a 4-millimeter per minute burn rate.

Q. But the literature that you're relying upon to sink up these two scenarios, how is that cigarette burning in the literature that you're referring to?

A. So the ranges of 4 millimeters per minute, those are cigarettes that are being tested on various substrates. So whether it be wood, concrete, plastic, it's looking at how that particular substrate impacts the rate of burning. And the primary thing that's happening is it's not able to -- the cigarette is not able to get entrainment around the entire circumference, so that's why the burn rate slows down.

Q. And with regard to -- well, you would agree with me that the subject fire and what we've described as to the cigarette being inserted into the dirt, at least one of the scenarios of how this cigarette was disposed of - you know - is not similar in any way to a cigarette being burned on a substrate?

A. No. I would say that the cigarette being burned at a substrate is very conservative, because if we believe the scenario that the cigarette was inserted into the dirt, as Deputy Croneiser indicated in his analysis, then the cigarette would be not burning at all. So the scenario that I was evaluating was one in which the cigarette was not extinguished, which is the scenario that Mr. Vieau is working with in his opinions rather than what the testimony has been, which is that the cigarette was, in fact, extinguished before he placed it in the pot.

Q. Fair enough. There wouldn't be any need to do any of this, if the assumption was that it could be extinguished, is that correct?

A. Correct.

Q. But my main concern is not necessarily if we're dealing with a lit cigarette or extinguished cigarette. It's what the relevance of the literature and the testing to this scenario in which we have testimony that a potentially -- or we have opinions in testimony that a potentially still ignited cigarette was -- or still lit cigarette was deposited into a pot that contained cigarettes and dirt, and not just deposited, but pressed into the dirt or pushed down into these items. How does that scenario equate in any way with the testing on substrates?

A. Right. So if I were to take a cigarette and I were to orientate it -- let's say the orientation was in the vertical direction as opposed to the horizontal direction, the literature will show that the burn rates are much faster. So the 9 minutes will go down to potentially half of that or less. If I take that same cigarette and I place it on a substrate like dirt, in a horizontal position, the literature will show that you get that same range, because the main driver behind what's happening is that you are blocking part of the

circumference that the cigarette has to entrain air and that's why we get these lower rates. The other thing that's important in all of this, when it comes to burn rates and the reason why we see these very consistent ranges, is that you can only get to a burn rate that is -- you know, at some point your burn rate becomes so slow that the cigarette extinguishes. So there is a competition happening where you have energy that's being dissipated to the surroundings and you have energy that needs to be maintained in the cigarette to keep it burning. If the burn rate slows down too much and that burn rate gets to typically -- it's on the order of 1 millimeter per minute, which is below any documented burn rates for any cigarettes, then you'll get extinguishment. So I don't know if that answers your question directly or maybe we need to piece it out.

Q. That's fine. I think we're going to work back and piece it through. But the literature that you're referring to, what literature are you referring to that supports that?

A. So two sources, Krasney, which I cited the full article or the full report in my report, and then the SFPE Handbook, Chapter 19 on Smoldering Combustion, and that's also cited in my report.

Q. And what about Krasney do you think has relevance to this case?

A. Again, I think what his report shows is that under various -- so Krasney looked at cigarette burn rate tests that were done across the world on hundreds of cigarettes under different types of conditions and then takes all of that data and summarizes the range of burn rates that are found and shows that those ranges are between 4 and 8 millimeters per minute, which is very close to what we find for these particular cigarettes.

Q. Okay.

A. And then the Smoldering Combustion chapter in the handbook talks about what I just mentioned, the minimum burn rate that's necessary to sustain combustion.

Q. Did any of those -- does any of that literature or any of the literature that reviewed deal with how cigarettes would behave when they're communicating with one another, as presented in this instance, meaning cigarette next to cigarette, lit cigarette next to other cigarettes?

MR. CASEY: Object to form.

A. No. I think that that's -- that's not really the point of why I cite that work. The point of the

calculation in my report is to say Here's the time frame that we have in order for this ignition source to ignite something else, for something else to start happening. And then if we look at the videos that were provided by Mr. Vieau, what we see actually is consistent with the other literature that I cited from Anon, A-N-O-N, is that if you take a bunch of cigarette butts and you put them in a plastic container, it very quickly starts producing smoke and then goes to flaming combustion within 20 to 30 minutes, which is essentially the information that I provided within my report when I cited the work that Anon did. It's very consistent with exactly what Mr. Vieau's videos that he cited show.

Q. Okay. Did you ever consider testing how the cigarettes would -- if the cigarettes were placed together, testing how long it would take for them to manifest into a -- into flame?

A. No, I did not perform that test.

Q. Is it possible for one cigarette to -- is it possible for these cigarettes, that are lit and placed into the planter, to extinguish but then light or ignite another cigarette?

A. I mean, it's certainly possible that ignition of other materials around it could occur, yes.

Q. So you don't believe that the presence of dirt, as reported by Croneiser, would affect the heat transport properties or ability to smolder in the dirt?

A. I believe that the presence of dirt can affect the transfer of properties. As I mentioned, the way in which it affects it, is it can block the ability of full air entrainment -- assuming the cigarette is actually laying flat on the substrate and not in the open air, it can block the ability of the cigarette to entrain air, and then what we see in those cases are ranges that are significantly higher in the ranges that are provide with the calculations that I did, looking at if it's on a substrate versus if it's in a situation of open air.

Q. You rely on the location of the cigarette burning on a substrate. When a cigarette is on a substrate, the actual end of the cigarette is not coming into contact with anything, is that correct, the butt of the cigarette?

A. If it's laying on a substrate evenly then, yes, the end of the cigarette is in contact with the substrate on the bottom of the cigarette.

Q. You're just in the very bottom of the end of the substrate? It's touching the very end, just on the small portion of the cigarette, correct?

A. I mean, the surface that's touching the substrate is essentially what I'm mentioning when we talk about air entrainment.

Q. What percentage of the cigarette, I guess, then, is touching the substrate?

A. I never mentioned it. I couldn't tell you exactly.

Q. More of the cigarette -- more of the end of the cigarette is not touching the substrate as opposed to touching the substrate, correct?

A. Correct.

Q. Was there video taken of the testing that you performed?

A. No. I took photographs.

Q. You said you did some cigarette dissection. Talk to me about that.

A. In the photographs that I provided in the report you'll see there's some photographs just looking at the length of the cigarette overall, from end to end, and then the portion of the cigarette that's actually containing the tobacco. So I was looking at how much of the amount of cigarette actually contains material that is burning during the smoldering process.

Q. You also say in your Conclusions "Ignition of other combustibles within the planter would have

occurred within this 9-minute time frame resulting in excess smoke production or flaming combustion." How do you conclude that there would be excess smoke production in that scenario?

A. So that's based upon the reference that I provided from Anon. And then also if you review the videos that Mr. Vieau provided, that show the tests that were done on the plastic containers, that has the cigarette butts in them, it shows essentially the same thing, that once the cigarette is placed in there, you start to get production smoke, and then within approximately 20 to 30 minutes it transitions to flaming.

Q. And where in the -- the Anon study, let's talk about that briefly. Tell me about that study and the way in which -- the way in which those cigarettes were tested, that would lead you to believe that excess smoke production would be produced.

A. Sure. So I think they provide that exact language, and I may have even cited it in my report. Let me just pull it up real quick. So what I put in the report, this is on page 9. It says "In the study on the ignition of paper materials in trash can by a lit cigarette, Anon found two general trends. First, the probability of a smoldering cigarette starting a

fire in paper materials found in a trash can is extremely unlikely. Second, if a smoldering cigarette does start the fire within the trash can, fire will quickly transition to flaming in about minutes."

Q. And this is testing the things that are located in a wastepaper -- or in a wastebasket, correct?

A. Right. So they did a number of different types of tests. And just to finish answering the first question you asked, the other part, here, is it talks about "In cases where a smoldering cigarette led to flaming ignition in a trash can, visible smoke was observed from the beginning of the test and visible flames were observed within 14 to 18 minutes."

Q. And you would agree with me that the Anon test didn't test how cigarettes would ignite other cigarettes and how long that would take?

A. No. But as I mentioned, the videos that Mr. Vieau provided, which I've seen those videos in the past, essentially show exactly the same thing, that you get smoke production almost immediately, and then within 20 to 30 minutes you're seeing visible flames. The one thing I will add about those tests is that, Mr. Croneiser, in performing those tests, is using full length cigarettes. So the 20 to 30-minute time frame

actually makes sense; if you take a cigarette that is -- you know, the entire duration of the cigarette, basically, is available versus what we're looking at in this particular case, which is about half, so he gets about twice the number that I did, looking at how much time passed to start flaming combustion.

Q. There is a -- there is a video that was cited by Mr. Vieau, that did have an hour and an hour and a half time frame, I believe it was an hour 25 minutes maybe, before flame was determined -- or before flame was seen in a potted plant, correct?

A. Right. And I feel that there is a significant amount of confusion on his part with regards to why you see those different time frames, and I'm happy to provide more information.

Q. Sure. Tell me your understanding.

A. So the calculations that I provided in the materials that I gave you, the one that talks about -- let me see what I called it. It's density calculations. So I wanted to just simply demonstrate the difference -- how density plays a role in the smoldering process. And the reason why in those videos you're seeing some fires happening in short time frames and then you're seeing other fires that are happening much longer time frames is because you're dealing with

one fire that's happening in the short time frame, is the cigarette butt. The fires that are happening in the longer time frame, that they're showing in the video, involve potting soil. So what happens in the smolder process is, as you increase the packing density of the material, then you significantly increase the smoldering rate -- I'm sorry -- I said -- I meant you decrease the rate, meaning you increase the time frame of over which smoldering occurs.

Q. So you're basically saying the more densely packed it is, the faster -- or the slower it will smolder?

A. Exactly. Because what's happening is the heat is essentially burning down into the potting soil material and you're not able to entrain a significant amount of air in that scenario, because you're burning into the material and your charring and polarizing (sic) it, so it takes -- it slows down the process and it takes a much longer period of time for that to then build up enough heat so that it then transition to flaming combustion. So I'm not disagreeing that you can have potting soil fires that can be of a longer duration. What I'm saying is, based on the facts in this case, there is no evidence that there was potting soil, so I'm evaluating cigarettes.

Q. Fair enough. But we also don't know how much -- how densely -- and I understand the difference with the potting soil -- but how densely packed the cigarette butts, potentially combined with dirt, were in the subject potting plant?

A. I think we do. I mean, Ms. Barker testified regarding how many cigarettes she smoked per day, how many times she changed or disregarded the butts since she had been there in a 10-day period. Mr. Vieau and I actually agree that the number comes out to be about 60 cigarette butts that would have been in the planter, which is what he indicated. So if you look at that and you take the size of the planter, you can calculate the density. And that's essentially what I did in the attachment that I provided you. That to me is about 5 times less than the average density of potting soil.

Q. And I do want to go through that in a second. But when you say it's 5 times less, is that significant with regard to smoldering?

A. Yes. It shows exactly what you'll see on a graph that looks at packing density versus smoldering rates. So there's been studies, and if needed, I can pull those and provide those studies. It's also provided and cited within Chapter 19 of the SFPE Handbook. But there are also more detailed studies

that look at how smoldering is impacted by packing density, and you see a very seep change occurs. As you increase the density of the material, it takes significantly longer for -- for smoldering to occur.

Q. Were you able to take the density calculation that you made on these -- on these -- in these notes, these calculations and apply it to how -- it's impact on the burn rate of a cigarette?

A. Yes. I mean, essentially the purpose of the calculations that I performed was to show that what we're seeing in these videos that Mr. Vieau provided makes complete sense. Right. The videos show - and I think I marked the times on -- if we need to look at the exact times I'm referencing in the videos, show that when you're looking at just the cigarette butts, you get that 20 to 30 minutes, and when you're looking at potting soil, you get that much more extended period of time, into the hours.

Q. What if you have a combination of cigarettes and potting soil?

A. So if --

MR. CASEY: Object to form.

A. If you have a lit cigarette, certainly lit cigarettes are capable of igniting potting soil. I'm not disputing that.

Q. When you -- when you did these density calculations, did you factor in dirt with the cigarettes?

A. No, because dirt -- as I mentioned, dirt is 80% mineral, so the dirt does not burn.

Q. Would it have created -- if it's mixed in with the cigarette butts, would that have created a change in the density of the entire potted plant -- or the entire materials located in the potted plant?

A. I'm not -- I guess I'm not really sure exactly how it would have been mixed in. If I were assuming this testimony about there being dirt in the planter were true, the cigarette butts -- I mean, she indicates that she's discarding them throughout her time, so I don't know how she -- to me they would be sitting on top of the dirt, not having mixed -- she didn't say anything about mixing it in the dirt or anything like that.

Q. And I guess my -- my belief in why it would be mixed in is based on the testimony from Deputy Croneiser, where she says she actually puts it down into the dirt when she put out her cigarette, which is one of the versions of how she may have been extinguishing cigarettes. So when I read that and see that, it shows that there is a layer of dirt toward the

top of the plant -- planting pot.

MR. CASEY: Object to form.

A. If the dirt -- if the cigarettes are actually being covered in some way by the dirt, I'm not seeing how they would even be able to sustain combustion. So I guess to answer your question, no, I did not consider that scenario, because it doesn't even seem to be a viable scenario to support any type of combustion condition.

Q. And I understand what you're saying with the dirt not being -- with the dirt not being something that contributes or assists with combustion. But I'm taking an overall picture of what may be a pot with more dirt than you're considering dispersed throughout cigarettes, which we do know could support combustion and ignition and whether that changes any of these calculations as to density.

A. If I -- I mean, I guess I can't even envision what you're describing. But it was not something that I evaluated with regards to density.

Q. Fair enough.

MR. ZIELINSKI: Why don't we take a quick break. I have to review a few things. I'm sorry I keep having an issue to address at an evidence exam. I don't want to delay this, but

can we take another 10-minute break.

THE WITNESS: Sure.

MR. ZIELINSKI: Thank you.

(Whereupon, a recess was taken)

EXAMINATION (Continued)

BY MR. ZIELINSKI:

Q. All right. We're back on. Dr. McAllister, I'm going to show you -- and we sort of touched upon it. I want to look at it a little bit more closely as to the testimony that you put in to a grid as far as the event timeline.

A. Okay.

Q. And the earliest time you said Ms. Barker smoked a cigarette on the patio was approximately 3 o'clock, right?

A. Correct.

Q. And that's based on testimony provided in discovery, as well as the fire investigator's report?

A. Right. That came from Ms. Barker, her deposition, as well as Investigator Wydra.

Q. And the similar time, 3:30, came from the fire -- one of the fire investigator's, is that correct?

A. The 3:30 time was the latest time that Ms. Barker had indicated that she had been smoking.

Q. And generally speaking everyone referred to times at 3 hours, 3 hours 15 minutes, 3 hours 30 minutes -- I'm sorry -- 3 o'clock, 3:15, 3:30, everyone was giving approximations/estimation of the general time that she either said or told folks that she had smoked a cigarette? Meaning they were approximations and estimates, correct?

A. Correct.

Q. And Ms. Barker testified that she walked through the patio area twice. What do you base that on?

A. So she indicated in her deposition that she left between -- I think it was 4 -- I forget what the -- I don't have her deposition testimony in front of me. The time frame of 4 o'clock indicates that's when she out to leave the house. In her deposition she said she went out, came into the garage, came back out of the garage, back in the house and then came back out again.

Q. And, again, the number that she generally provided was an approximate round number of 4 o'clock, correct?

A. Correct.

Q. But there's no video evidence of when she, specifically, passed through that time? It's based on

her recollection of events, correct?

A. Correct.

Q. And then you have the timeline of Ms. Currey reports fire to 911 at 4:57 p.m., correct?

A. Correct.

Q. And that's based on Ms. Currey's testimony and the fire report of when 911 was called, correct?

A. Yes.

Q. And it's your understanding that at 4:57, that's when the fire is essentially engulfing the back patio of the property, is that correct?

A. Well, the initial observation -- right. So at the time that it's called in, I believe Ms. Currey's testimony was that she was seeing flames, but her initial observation is smoke.

Q. But she resided across the street, correct?

A. Yes.

Q. And to see smoke and then shortly thereafter flames, would you agree with me that at that point items on the patio -- items on the patio are fully involved in fire?

A. I would agree that the fire was well developed at that point. I don't know if I can speak specifically to what items on the patio were burning.

Q. Did you perform any analysis in this case as

to, if the fire started in the potted plant and manifested itself in to flame, how long it might take to ignite other nearby combustibles and get in to the developmental stage that you spoke about, that Ms. Currey may have identified?

A. Actually in response -- or in consideration of what Mr. Vieau had testified in his deposition -- or after reviewing his deposition, one of the things that he indicated was that he believed the tarp to be the next item ignited from the fire in the pot. So I did look at the repetitive of which -- or the spread rate that the flame would travel on the tarp. So the literature shows that the rate of combustion -- the rate of flames spread across the thin fuel in the vertical orientation is approximately 1 inch per second. So what that basically means is that you would spread from the bottom of the tarp to the top of the roof structure of the overhang, across the patio within a few minutes.

Q. And when you say 1 inch per -- I'm sorry -- 1 inch per, what was the last part?

A. Per second.

Q. How long would that take for the tarp to be consumed once it was ignited, based on your calculation?

A. So that would be a few minutes. Between one and a half and 2 minutes to go from the bottom of the tarp to the top of the tarp.

Q. And then at that point the fire would progress into the overhang, correct?

A. Correct.

Q. And do you have any understanding or testimony today that you could provide as to what would occur if fire had initially attacked that overhang from the tarp that was ignited?

A. I did not do any further calculations beyond that. My interest was in understanding, based on Mr. Vieau's testimony, about how he believed the fire spread, how long it would take for it to spread - you know - from the bottom of the tarp to the top of the tarp.

Q. You're familiar with the Ignition Handbook?

A. Yes.

Q. And I have the entire Ignition Handbook in there, but it's probably pointless to go into. But since you are familiar with the Ignition Handbook, I'm going to show you -- or we're going to mark what's been marked as Chapter 14 of the Ignition Handbook. It starts on page 716.

MR. ZIELINSKI: We'll mark that as

Exhibit 2.

(McAllister Exhibit 2
marked for Identification)

Q. Do you see that?

A. Yes.

Q. We talked earlier about you -- I believe it was the -- that you relied on Krasney and Anon and specifically with regard to how cigarettes burn or might ignite materials that would be in a wastebasket, correct?

A. Well, Krasney is just looking at the burn rates of cigarettes.

Q. Right. Right. Sorry. So it would be Anon, correct?

A. Correct.

Q. And that talks about the time it would take to ignite materials and the ability to ignite materials that are commonly found inside the wastebasket, is that correct?

A. Correct.

Q. And it's fair to say that Anon is a significant treatise that you're really upon in reaching your concussions in this case, is that correct?

A. No. I mean, I think I'm relying upon the

calculations that I did, even using the videos that Mr. Vieau produced, which I think further validates Anon's research, but are specific to cigarette butts.

Q. Have you ever relied on the Ignition Handbook in reaching expert -- or reaching conclusions as an expert in fire investigations?

A. Yes.

Q. And what have you used the Ignition Handbook for in reliance?

A. It's voluminous and contains -- I couldn't tell you what specific material I utilized it for.

Q. But it's a common -- it's a common -- it's a common -- it's a common document that's referred upon by yourself and other fire investigators in the field, correct?

A. Yes, I believe so.

Q. So in your report you've concluded that in cases where a smoldering cigarette lit, the flaming ignition in a trash can, visible smoke was beginning of test and visible flames were observed within 14 to 18 minutes, correct?

A. Correct.

Q. And you get that from -- and that is a source that you get from Anon, correct?

A. Correct.

Q. I'm going to show you what we've had marked here with regard to referencing that Anon -- similarities in that Anon claim. I'm just going to find what I want here. Page 718. So we'd start in the bottom left-hand column.

A. Okay.

Q. Where it says "The effectiveness of cigarettes as ignition sources for wastepaper baskets has been examined. For wastebaskets filled with paper, snack wrappers, fast food bags and polystyrene foam coffee cups, ignitions were not observed." And you would agree that that's essentially citing the Anon study that you referenced, correct?

A. Correct.

Q. I'll continue. "Oily paper towels turned out to be ignitable, but out of a total of 300 tests of dropping cigarettes in the wastebaskets, flaming occurred in only occurred in 5 instances. The times the flaming ranged from 14 to 18 minutes." Again, that's the Anon study, correct?

A. Correct.

Q. The Ignition Handbook then goes on to reference "A German study provided more comprehensive results (Table 22) - which is to the left - "but the results were based on 12 to 15 trials. In fact, much

longer ignition times have been observed in real fires. Figure 20 shows documentation of a fire that occurred due to cigarette disposal in a rubbish container. The time between the last human activity at the place of origin and the eruption of flaming was 192 minutes. Some additional research is discussed under Paper products." Did you consult this aspect of the Ignition Handbook before you reached your conclusions in this case?

A. No, I did not.

Q. And were you aware that the Ignition Handbook had cited some field observations that may have been contrary to some of the laboratory testing cited in Anon and other articles?

A. I have no records to review, so I can't say that they're contrary to what Anon found. I'd need to review the paper - you know - what specific conditions were tested.

Q. Fair enough. But would you agree that the Ignition Handbook, here, is essentially trying to point investigators and fire experts in the direction that all of what is found with regard to the laboratory testing of ignition times, that is attempted to have been replicated? It's not necessarily what may be occurring in the field?

MR. CASEY: Object to form.
A. Can you repeat the question?
MR. ZIELINSKI: Read it back, please.
(Question read)
Q. I'll rephrase. In reading that aspect, that "The time between the last human activity at the place or origin and the eruption of flaming was 192 minutes." Why do you think the Ignition Handbook is citing this field observation in a segment devoted to ignition times that come from lab testings found in Anon?
MR. CASEY: Object to form.
A. I don't know. I'm not able to answer that question.
Q. Do you have any experience with any sort of testing that -- sometimes that laboratory testing is not necessarily able to replicate what occurs or what can happen in the field?
A. I mean, there are ways in which a laboratory test may not capture all of the various, different aspects of what may have happened. I mean, that's why it's important to have sufficient data about what actually happened in a particular incident, in order to -- if you're going to attempt to recreate what you believe occurred.
Q. You talked about, in your report, that

Ms. Barker walked past the planter multiple times as she prepared to leave, approximately a half hour to 1 hour after the discarded cigarette and that she didn't see flames or smell smoke coming from the planter at any time. That's consistent with your conclusion?

A. Yes.

Q. Based on your review of the evidence, how many times do you believe Ms. Barker walk past the subject planter?

A. She indicates 3 times.

Q. And would one of those 3 times be right after she extinguishes the cigarette?

A. No. She testified that she smoked her last cigarette, went inside, read a book and then left the house at 4 o'clock. So the 3 times would be her leaving to go to the garage, her coming from the garage and going back inside and then her coming back out again to go to her car.

Q. And it's your conclusion that any sort of smoldering fire would not go unnoticed by someone?

A. Within that period of time and based upon, again, the videos that Mr. Vieau had provided, as well as the information contained within Anon, talks about production of smoke being immediate and the flame

occurring within the 14 to 17 minutes, yes, I believe that it probable that she would have smelled smoke and/or seen smoke and flames.

Q. Is it possible for someone who smokes as frequent as Ms. Barker does in that area, that the lingering smell of smoke - you know - on Ms. Barker's person, in that general area could mask the odor of unintended combustion in a flower pot?

A. So the material that's burning here is the cigarette material, as well as the butt of the cigarette. It's a different type of smell than regular nicotine burning. So it's not exactly the same type of smell. So my answer would be -- I'm trying to remember the exact question. I think my answer to your question would be that, no, her being a smoker wouldn't mask or smell something burning. In fact, she indicated in her deposition that she had smelled something burning. A week or a couple days prior to this incident, she was inside her house and smelled something burning outside.

Q. And does the absence of physical flames or a smoke odor, to the extent there may have been one, preclude a smoldering fire from existing?

A. Can you rephrase it? I'm not quite sure I understand your question.

Q. Is it your testimony, based on your

understanding, that at 20 to 30 minutes there would have been visible flame coming from the flower pot?

A. Yes.

Q. It would have been most likely that visible flame would have been coming from the flower pot?

A. As well as smoke. Both.

Q. Had you ever done -- have you ever investigated any fires that involved a flower pot, prior to this one?

A. Not that I recall, no.

Q. And do you -- in your review of this file, did you get an understanding as to the depth of this flower pot? Was that factored into your density calculations?

A. No. The depth is related to how dense the material is packed.

Q. So when we did -- when you did the density calculations, the depth of the flower pot would not matter at all?

A. The depth of a flower pot wouldn't, no. But density calculations do include the 1 inch of cigarette butts that Ms. Barker indicated were in the planter. So that's just, basically, in order to get an idea of what the volume is that the material is distributed over.

Q. Now, given that it was likely an estimate of 1 inch, by Ms. Barker as to how much cigarettes were in that, would the density calculation change in any way if there was, in fact, 2 inches of cigarettes inside the potted plant?

A. No. Because it's driven by weight. So the more cigarettes that are in there -- so if there's -- so if there is a larger depth of cigarettes, I mean, there is more cigarette butts associated with that depth. So it would, actually, just scale.

Q. What do you mean by just scale?

A. So you're not really changing anything. In other words, you -- in order for it to become more dense, you would have to take the same 1 inch area and somehow pack it down or push down all of the cigarettes to compress them.

Q. So it's not necessarily a mound? It's how they're packed?

A. Exactly.

Q. Did you get any sense, from reviewing the deposition transcript or the transcripts of others, who spoke to Ms. Barker as to how these cigarettes were packed?

A. She did not indicate that she pressed them down. So the calculations for density would be -- that

I performed would be pretty conservative. They assume, essentially, that if you were to take a cigarette and, let's say, light it up so there's no air space whatsoever, that's the density, basically looking at the weight of the cigarette and the amount of area that it occupies. In reality, when people are just throwing cigarette butts into containers, they're kind -- they're scattered about. So the calculation I performed would be more conservative.

Q. And so when you say it's conservative, did that factor in the fact that she may be pushing the cigarette butt -- or half of the cigarette, as she described it, into the potted plant?

A. Unless she's literally taking her hands and compacting down all of the cigarette butts, then it's not going to change the density.

Q. Okay. And, basically, just so we can put a bow on this, but whether it was 1 inch of cigarettes or 3 inches of cigarettes, it wouldn't change the density calculation?

A. No. Because, again, if it's 3 inches, that means there's more cigarette butts, so it would just scale -- it would just scale accordingly and it wouldn't change that number.

Q. Now, when you are dealing with burn rates and

the testing that you relied upon, like the Anon test or the Anon literature, none of those tests were performed outdoors, is that correct?

A. Correct.

Q. Do you believe that the fact that this fire occurred on a patio, outside, would have any way impacted the burn rate and/or the length of time -- well, actually let's start with burn rates. Would it have impacted the burn rates?

A. I want to make sure I understand your question, because you mentioned Anon and then burn rates. Are we talking about the burn rates of cigarettes? Is that what you're asking me?

Q. Fair enough. Fair enough. And I jumped the gun there. Yes. Let's talk about what affected the burn rates, period.

A. Okay. So then I'm going to modify my previous answer. Krasney's work did look at the impact of environmental conditions on burn rates. They looked -- so that range that I provided considers what happens if there's what's called forced conduction, where there is a wind condition that is causing the acceleration of the burn rate, what happens when the air around it just basically stagnant, what happens if we put it vertical, horizontal. All of those types of

things are considered in the work that he summarized in his report. So with regards to the outside environment, in this particular case, according to Ms. Barker she's placing it inside the pot and there's an inch of cigarettes at the bottom, there's no air entrainment that's occurring there; as far as the wind is it going to be significantly impacting what's happening at the bottom of the pot. Now, to the extent that we assume that it did, that would only increase the burn rate, not decrease it.

Q. How about the humidity with regard to the weather and potential dryness of the dirt or dryness of the materials found within the potted plant?

A. The dirt itself, again, is not combustible, so the moisture content of the dirt wouldn't play a role in the cigarettes -- in the impact it has on the cigarettes. I mean, I suppose if the dirt were very moist, it would, actually, probably cause the cigarette to go out, because too much moisture touching the paper material on the cigarette would make it wet and cause it to extinguish.

Q. I want to mark your calculations as Exhibits.

MR. ZIELINSKI: I don't know if we got the chance, Brian, to -- we can forward it to the stenographer after this.

Q. Let's actually go with -- let's look at the burn rates real quick, the burn rate notes that you have.

MR. ZIELINSKI: We'll mark that -- it's Burn Rates, when we're marking this for the transcript, and we'll mark that as McAllister 3.

(McAllister 3 marked
for Identification)

Q. This is the one page of notes that you marked or labeled as Burn Rates. And you noted the -- you noted the temperature and calm winds in the right-hand corner, correct?

A. Correct.

Q. And that was at the scene of the fire, correct?

A. No. That's -- this is the testing that was done.

Q. Okay.

A. So this is the conditions on the day that the testing was done.

Q. Is that the temperature in your garage or you were doing it outside?

A. Right. So that was the temperature that was within -- essentially directly outside of the garage area.

Q. But the test itself was inside of the garage?
A. No. It was right outside of it, because I didn't want the cigarette smoke smell.
Q. Okay. Fair enough. And so these are essentially -- what are you taking notes of here? The times for each burn rate?
A. Right. So this is the time from beginning to end of test. So this is essentially the raw data that then is used or reported within my report.
Q. And is this essentially the only notes that you took during the testing?
A. Yes.
Q. Okay.
A. Other than the photographs.
Q. Right. Fair enough. All right. And then the other document which I was more interested in is the Density Calculations.
MR. ZIELINSKI: We'll mark that as McAllister 4.
(McAllister Exhibit 4 marked for Identification)
EXAMINATION (Continued)
BY MR. ZIELINSKI:
Q. We sort of discussed this, but I want to go line by line, so the record is clear. So you say

10 days times 20 cigarettes per day equals 200 cigarettes divided by 3. That's essentially coming to the conclusion that there was likely 67 cigarettes disposed of in the potted planter at the time of the fire?

A. Correct.

Q. Okay. And that's based on Ms. Barker's testimony?

A. Yes.

Q. And you will agree with me that she didn't know exactly when the last time she disposed of or emptied that potted planter, correct?

A. Correct.

Q. So this is more of an estimation, based on -- based on when she may have last emptied the potted plant?

A. Right. Mr. Vieau says in his deposition 50 to 60, so I gave them a couple more based on what she said, and seems to line up with what his report says as well.

Q. And then it says "Planter diameter equals 6 inches depth equals 1 inch cigarettes." Where did you get the planter diameter from?

A. That was from Ms. Barker's deposition testimony.

Q. And so the depth, again, you put 1 inch of cigarettes, but you don't know the depth of the actual planter?

A. Right.

Q. Would the depth of the actual planter matter for how long it may take for the nearby tarp to become ignited?

A. It could have some minor impact on it. I mean, if the depth is too low, then the flames aren't going to be able to be high enough in order to impact the planter.

Q. You then put "Volume equals" -- well, I'll let you -- Volume equals what here?

A. That's just the Volume Calculation. So if you take the 6 inch diameter planter, 1 inch depth, that's the volume you have, the cylindrical volume.

Q. And then you say "Cigarettes equal 1 gram." What is that based on?

A. So that is the weight of an average cigarette. And, actually, I noticed in the chapter that you -- we were just discussing, the -- the 1 gram is the average weight of a cigarette. It is also mentioned in the chapter that we were just reviewing, Chapter 14, from Babraukas, the name of the author, his Ignition Handbook. And the spelling is

B-A-B-R-A-U-K-A-S.

Q. And then the -- so then essentially what you're trying to achieve is what the weight and grams of the cigarettes that you believe were -- could have been in the potted plant at the time of incident?

A. Right. Right. So then it's just a matter of taking the weight of the cigarettes over the volume in order to get the density.

Q. And then you put in the average potting soil density. Where did you get that information from?

A. So I went online and researched a couple of different manufacturers, and that is their other product data sheets, that's the average range that you get for density.

Q. And is that why you then say 5 times?

A. Right.

Q. Other than this calculation, did you do any other calculations?

A. I mean, we -- I mentioned to you the flame spread rate on the tarp; that wasn't a calculation I wrote out. It's something I did in my head.

Q. Did you do that before you wrote your report or did you do that in preparation for today?

A. That was in response to the rebuttal and deposition review.

Q. While we're looking inside of the folder - I didn't get a chance to look at this before - you have four invoices listed. We can mark them all together as McAllister 5.

(McAllister Exhibit 5
marked for Identification)

EXAMINATION (Continued)

BY MR. ZIELINSKI:

Q. We had discussed earlier when you were first retained, and it appears that on July 28th, 2020 you received a $5,000 or you billed for -- or were paid for a $5,000 retainer, is that correct?

A. Correct.

Q. Does that in any way -- and the date is July 28th. Does that in any way refresh your memory as to when you were first retained and brought in to this matter?

A. Yes. So it -- I don't think that's the exact date. But that would certainly be around the time frame, give or take maybe a week, of when we were first asked to get involved in the case.

Q. Back to your Conclusions. This is now on page 17. Where you say "The timeline of events and witness observations is inconsistent with a hypothesis that a carelessly discarded cigarette caused the fire."

Do you see that?

A. Yes.

Q. And then you go on to say "The carelessly discarded cigarette hypothesis must be rejected because it is inconsistent with the facts of this case and known scientific and engineering principles." Do you see that?

A. Yes.

Q. Can you specify which facts the scenario is inconsistent with?

A. So the timeline with regards to when the cigarette was last smoked and when Ms. Barker is walking through the area, when the fire is discovered.

Q. And you say -- when you say "known engineering principles," which engineering principles is it inconsistent with? Just -- well, I'll let you answer that.

A. Smoldering combustible principles, burn rates, point spread. The other thing, too, I would add, is that consistent with what the local jurisdiction investigators concluded, I would also agree that another reason why this theory is inconsistent with the facts of the case is because Ms. Barker indicated that she extinguished the cigarette.

Q. Have you ever experienced -- have you ever investigated fires and been part of fires where the suspected cigarette -- where you determined that a cigarette was the cause of the fire, despite a witness saying that they didn't smoke or if they extinguished a cigarette properly?

MR. CASEY: Object to form.

A. None that come to mind, as I sit here today.

Q. So as you sit here today, you've never opined in any case that a cigarette was a cause of a fire, when someone who was the defendant in that case denied being responsible for improperly extinguishing a cigarette?

A. No. What I said is I do not recall as I sit here today. I'm not saying it's not possible. But offer the last 20 years I don't -- I don't catalog things in my memory --

Q. You've been a part of cases in the past where witnesses have provided -- have provided untruthful statements, is that a fair assessment?

A. Yes.

MR. CASEY: Object to form.

Q. Have you been part of cases in the past where witnesses have provided information and testimony that was self-serving or beneficial to them?

MR. CASEY: Object to form.
A. Yes.
Q. In analyzing this case, did you consider the fact that Ms. Barker may have believed she properly extinguished it, but that she may, in fact, did not?
A. Absolutely. That is, in fact -- I mean, the Cause section of my report assumes that she -- what if she didn't, let's test that hypothesis and see where we get to.
MR. ZIELINSKI: Why don't we take a 10 minute break. I don't have much more. I just want to go through some things.
THE WITNESS: Okay.
MR. ZIELINSKI: Is that all right with you, Brian?
MR. CASEY: Yes. That's fine.
(Whereupon, a recess was taken)
EXAMINATION (Continued)
BY MR. ZIELINSKI:
Q. Dr. McAllister, just in reviewing your report and going through the Density Calculations, is there a reason why - and tell me if I'm missing it - that you didn't cite the density calculations or anything that we discussed in those terms in your actual report?
A. These are prepared in response to Mr. Vieau's

rebuttal and his deposition. There was no indication in Mr. Vieau's original report that he believed that there was potting soil within the planter. So this was an analysis that was done in response to that.

Q. And when you say "done in response to that," what about the potting soil made you do this density calculation?

A. So I felt like there was some confusion on his part in understanding why you get significantly different smoldering periods when you have just cigarette butts versus when you might have potting soil. He seems to be conflating the two things as if they're one and the same. So the purpose of the density calculations was simply to explain from the scientific standpoint why these two types of scenarios are different, the scenario where you just have cigarette butts versus the scenario where you may also have potting soil involved.

Q. Is there any -- and perhaps you said this earlier. But just to be clear, is there any data that you relied on, that you can point me to, that shows how cigarettes function with regard to the specific density calculation that you came up with? Is there a scientific measure of that?

A. I'm not sure when you say how they function.

Can you be more specific?

Q. Yes. I guess when we talked about -- we talked about the density calculation, obviously your conclusion shows that the density is -- if we just have potting soil versus we just have cigarettes, it's 5 times greater. You list it as 73 kilograms, right?

A. Right.

Q. As the density?

A. Yes.

Q. Is there any literature that ties in to specifically how a cigarette would perform in 73 -- in something that has the density of 73 kilograms or around that obviously, not precise?

A. There are -- not specifically to cigarettes. As I mentioned there's literature that looks at how density impacts smoldering rates. The thing that I had mentioned before, that I'm pointing to, that kind of explains this in a visual sense, is the videos that Mr. Vieau provided, as well as the testing that's done by Anon, that talks about how much time it takes before you get to flaming for something that's not dense versus something that's very dense, like potting soil.

Q. And would you agree with me that if the dirt that was discussed previously would have been identified as potting soil, would that have changed

this calculation in any way?

MR. CASEY: Object to form.

A. It wouldn't have changed the calculation. As I mentioned before, I don't disagree that potting soil is capable of igniting and that it's capable of smoldering for longer periods of time. So it doesn't impact the density calculation, so to speak. I mean, they're not related.

Q. If there was -- again, I know no one has testified to this. So if there was -- if there was potting soil -- let's just say for a minute that the planter was half filled with potting soil and a person was putting cigarettes into that potting soil - you know - when they said they put the cigarette in, they would actually hit potting soil and hit that surface, would that have changed your -- wouldn't that change the density and the density calculation that you did?

MR. CASEY: Object to form.

A. No. The density calculation is, again, simply looking at the difference between if we had only cigarettes versus if we have potting soil. It's looking at the rate at which smoldering occurs within the materials that are actually burning.

Q. And I guess what I'm saying is, if it's not as black and white as cigarettes versus potting soil

and we have a mixture of cigarettes and potting soil, can this density application then apply?

A. So if it were a mixture, then I would have to know more information about the exact mixture composition.

Q. And is it fair to say, based on the conflicting testimony that we have in this case, that it's not precisely known what was in that potted planter at the time of this incident?

MR. CASEY: Object to form.

A. So it's -- as I mentioned before, I don't believe that we have conflicting testimony. What we have is sworn testimony from Ms. Barker and then we have secondhand testimony from other individuals. That's not the same as Ms. Barker saying two different things - you know - her physically testifying or writing a statement which indicates two different things.

Q. So I guess what I'm saying is, so you're basically taking what Ms. Barker says at her deposition is what -- most probably what occurred or took place or was located inside that planter?

A. That, and I also considered the idea that there be could have been dirt, and neither one of those two things changed my opinion.

Q. And again we're dealing with people's recollection of what may have been -- or one person's recollection of what may have been in a planter that essentially was used to discard cigarettes, correct?

A. Correct.

Q. And not -- you know, I think it goes without saying, but I'll lay the foundation for it. Witnesses observations aren't always accurate or people don't necessarily even take the time to fully understand everything that may be contained in a particular planter?

MR. CASEY: Object to form.

A. Correct.

Q. So I guess, would this opinion change, if for whatever reason there were leaves or other debris inside of this potting plant, that Ms. Barker may not have recalled had been in there or had blown in there? Would that have changed any of this analysis, from your prospective?

MR. CASEY: Object to form.

A. I didn't specifically analyze that, so I can't tell you without going back, looking at it, seeing how it sits within the timeline of events. I mean, I utilize and analyze things based on scientific processes, relying upon known facts and data.

Q. But you'd have to agree that when you're doing such an analysis, that the known facts, especially in an instance like this, where we're dealing with human recollection of a potted plant or a potted planter, that those facts and data may not be 100 percent accurate?

A. The facts and data have to be considered within the context of events. It is possible that people may not recall everything. But I most certainly can't make things up. I can't say that something was there if I have no basis to indicate that it was.

Q. No. Fair enough. And I get that. And I'm not saying that's what should have been done here. I guess my suggestion is, you're basically saying that the timeline proposed is incapable of occurring as it is stated. And to do so, I just want to -- when I'm asking you questions about the variables, I guess my question ultimately becomes, do variables -- if variables were different with regard to items that were in the potted plant, would say that potentially change your timeline?

A. Sure. What it means is that I would have to re-evaluate my hypothesis based on that date -- that new data or information of facts. It would have to be tested against that information.

Q. And have you ever had experience with smoldering fires, where items were -- items were -- where a fire smoldered for a period of hours?

A. In the cases that I recall, I don't recall anything smoldering for periods of hours, with the exception of self-heating cases. I mean, in self-heating, which is a different type of phenomenon with smoldering, those can last for hours. If we're talking specifically about cigarettes or things ignited by cigarettes, no.

Q. And in this instance we're not talking about hours? We're talking somewhere between an hour and a half and 2 hours maximum before we have a fully involved structure fire, correct?

A. Correct.

Q. And in the calculation -- and I know we talked about Ms. Barker walking back and forth. We can get in to that if that exists within your answer. My question is, have you done any calculations as to when flame would first appear under this scenario and how quickly you would have a fully involved structure fire?

A. Not between those two points. I feel like there were two questions in what you just asked me. Yes, I have done calculations or presented data within my report to indicate when flame would appear, but not

a calculation beyond what we talked about with this spread on the tarp, to show when all of the area in the back would be on fire.

Q. You did calculations with regard to how quickly flame would appear. Did you do any calculation for how long flame would sustain?

A. Sustain on what?

Q. Sustain within the potted planter?

A. No.

Q. Would you be able to do calculations that's would provide a timeline for that?

A. If we're talking about sustain within the cigarette butt material? I guess I don't really know -- what are we talking about burning or calculating the cigarette -- -

Q. I guess that's what we have right now. I'll start with that. Sustained within the 67 cigarettes that we've calculated would exist within the potted plant?

A. That's a calculation that could be done.

Q. Do you have a general sense of what the outcome of that calculation would be?

A. I do not.

Q. Because we also have to factor in the timeline of this entire process is -- you know -- how

long a flame may have -- if a flame did occur within the potted plant, how long that flame may have been maintained within the potted plant before igniting the tarp. Would you agree with that?

A. Yes.

Q. As part of this series of events here, is that correct?

A. Correct.

Q. Have you ever given a presentation with regard to cigarette and cigarette-related fires?

A. Not that I recall.

Q. Have you ever written any articles or any publications with regard to cigarettes and cigarette fires?

A. Not that I recall.

Q. How about presentations in any way that had to do with smoldering fires?

A. Yes.

Q. When I say -- and I know that probably ticked off a bigger box than the cigarette question. But generally speaking, what presentation do you recall that dealt with smoldering fires?

A. So I teach a class at the National Fire Academy on fire dynamics, and that covers various types of stages of combustion, different types of flaming

fires, smoldering fires. And actually -- you should say -- when it comes to your question about publications, I mean for sure there's discussion about smoldering fires and the types of materials, smoke and so forth that are produced in smoldering fires within my chapter in the SFPE Handbook. So, I guess, to some extent I've written about smoldering fires and taught classes regarding smoldering fires as well.

Q. The classes that you taught with regard to smolders fires, was that -- would those have been video recorded? Do you have any slides or anything like that? Is there any -- is there any recording of any kind of those presentations?

A. The NFA classes are-- there's slide Deck, D-E-C-K, material, so that would be contained within there. There are not videotaped courses. With regards to other classes that I would have taught, that would have included any discussions about smoldering combustion that are videotaped, the class I teach for the University of Maryland, that probably -- they're -- I mean, they're videotapes whether they still exist, I don't know where those live. And then I also used to teach an advanced fire dynamics class at EKU, and most of those lectures, because they're online programs, those are videotaped.

Q. The three literature that you rely upon here in your opinion, do you have any recollection about citing any of those in any of your presentations that you did?

A. It probably wouldn't have been cited in the presentation necessarily, no.

Q. Would you have used contents from any of them in the presentations?

A. The SFPE Handbook chapter on the smoldering combustion would have included contents from -- or the presentation would have included contents from that chapter.

Q. Would you have access to some of those videotape recordings or would they -- for example, for the University of Maryland, would that be with the university?

A. So I don't know what happened -- the one for EKU, I would no longer have access to, because I don't teach for them any longer. The ones for University of Maryland, they change -- as we have new classes, I don't know if I can access older ones, so I'd have to go in and see.

Q. I do not believe I have any more questions for you. Thank you for your time. I appreciate it.

MR. CASEY: We would like to read and

sign.

MR. ZIELINSKI: Etran please.

MR. CASEY: Whatever we did for Dan Vieau, I think we should do.

MR. ZIELINSKI: We'll do what we've been doing.

MR. CASEY: I don't care. If I have to pay, I'll be. If you want to do it the New York way --

(Whereupon, the Examination concluded)

(End Time: 2:36 p.m.)

-o0o-

ERRATA SHEET

JAMIE McALLISTER, Ph.D.

C E R T I F I C A T E

I HEREBY CERTIFY, that I have read pages ____ to and including page _____ and that the same constitutes a true and accurate transcript of the testimony given by me, under oath, at the time and place indicated herein.

_____

JAMIE McALLISTER, Ph.D.

Subscribed and sworn to before me
this _____ day of _____, 2020.

NOTARY PUBLIC

My Commission expires the 13th day of February 2022.

C E R T I F I C A T E

I, JACLYN B. CONTE, a Shorthand Reporter and Notary Public in and for the State of New York, DO HEREBY CERTIFY that the foregoing is a true and correct transcript of my shorthand notes in the above-entitled matter

Date: November 16, 2020

JACLYN B. CONTE,
COURT REPORTER.

S

FireTox

EXHIBIT 1

168 West Main Street # 422, New Market, MD 21774 Tel: (301) 580-1181 *www.firetox.com*

ANALYSIS OF THE FIRE WHICH OCCURRED ON APRIL 6, 2019 AT 5398 HEMLOCK DRIVE IN LOWVILLE, NEW YORK

by

Jamie McAllister, P.E., Ph.D., C.F.I., C.S.P
Fire Protection Engineer and Toxicologist

Case:
Philadelphia Indemnity Insurance Company vs. Kathleen Burke Barker
In the United States District Court
Northern District of New York
Civil Case No. 1:19-cv-1456

Submitted to:
Attorney Brian Casey
Cabaniss Casey, LLP
4 Tower Place, Suite 100
Albany, New York 12203

Submission Date:
September 29, 2020

The analysis presented in this report serves as a Rule 26 disclosure of my expert opinions in the case of *Philadelphia Indemnity Insurance Company vs. Kathleen Burke Barker*. In preparing this report, I have reviewed the following materials:

- Summons and Complaint
- Answer to Jury Trial Demanded
- Report of Daniel Vieau
- Lewis County Building & Codes Department Records
- Lewis County Origin & Cause Team Fire Investigator Report Worksheet
- Lewis County Sheriff's Office Incident Report and Photographs
- Bellinger Photographs and OSCR 360 Photographs
- Watertown Times Photograph
- Plaintiff's Document Production Pursuant to Rule 26 (Def. Exhibit A)
- Plaintiff's Response to Defendant's Discovery Demand (Def. Exhibit B)
- Plaintiff's 2nd Supplemental Document Production (Def. Exhibit C)
- Plaintiff's Response to Defendant's Interrogatories (Def. Exhibit D)
- Plaintiff's Supplemental Response to Defendant's Interrogatories (Def. Exhibit E)
- Defendant's Response to Plaintiff's Interrogatories
- Defendant's Response to Plaintiff's Request for Production of Documents
- Defendant's FRCP Rule 26 Required Disclosure to Plaintiff
- Deposition of Denise Weaver
- Deposition of Steven Jackson
- Deposition of Christopher Vaughn
- Deposition of Katherine Currey
- Deposition of Kathleen Barker
- Deposition of Brett Croneiser
- Deposition of Richard Knight

My analysis and opinions are based upon my review of these materials, as well as, my experience, knowledge, and training, as detailed in my resume provided in Appendix A. My fee for preparation of this report, as well as my fee for deposition or trial testimony is $350/hour. A list of testimony for the last four years is provided in Appendix B.

The analysis and opinions expressed within this report are based upon the facts and evidence reviewed as of the submission date of this report. My opinions are held to a reasonable degree of engineering and scientific certainty. If additional information is received which changes my opinions in this case, I will amend or supplement my report accordingly.

BACKGROUND

On April 6, 2019, a fire occurred at 5398 Hemlock Drive in Lowville, New York. The structure was a two-story, wood frame, apartment building constructed circa 1986. The building contained four apartments. Two apartments (units A and C) were located on the first level of the structure, and two additional apartments (units B and D) were located on the top level of the structure. Each apartment contained three bedrooms, 2 bathrooms, a living room, kitchen, and mechanical room. An attached single car garage was also provided with each unit.

At 4:57 pm on April 6th, Katherine Currey contacted Lewis County 911 to report a fire at 5398 Hemlock Drive behind garages A and B, as shown in Figure 1.

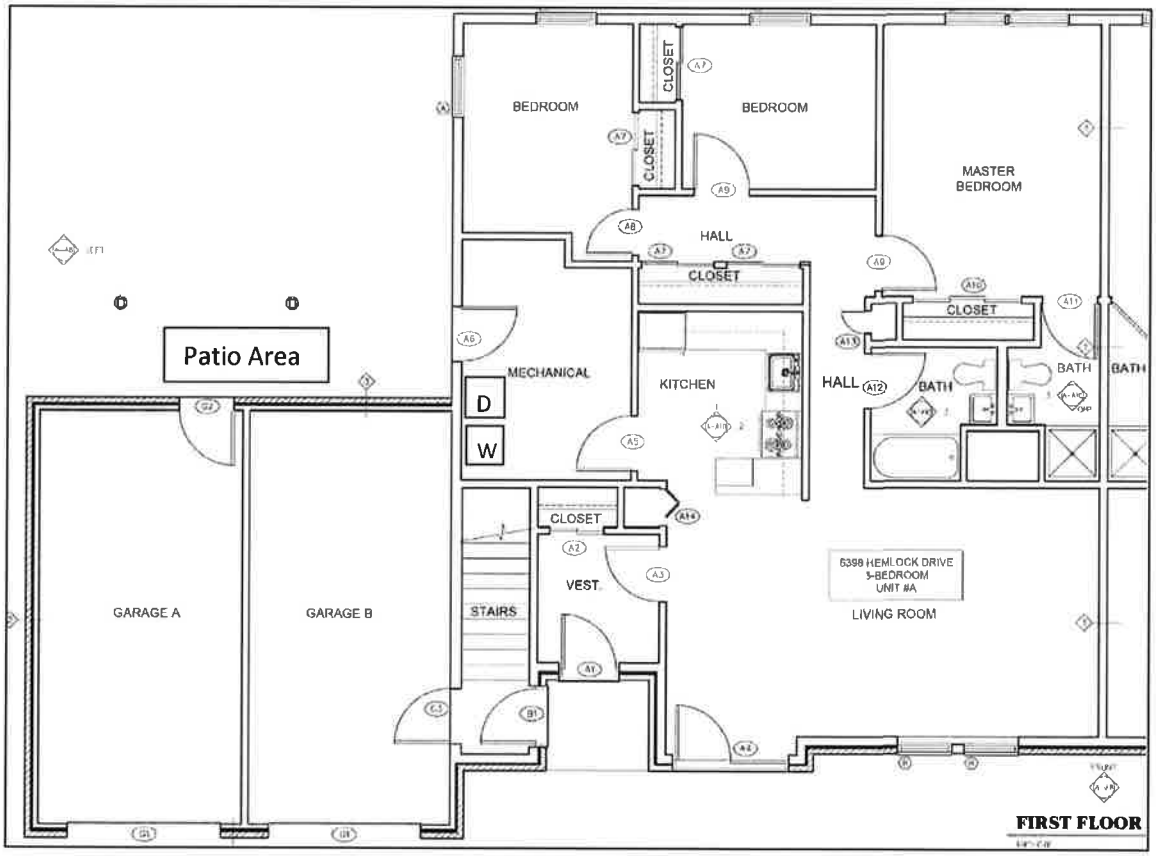

Figure 1: Unit A Layout (extracted from Defendant's Exhibit C (PL001166)).

The dispatch notes indicated "Reports that the apartment across the road is on fire. Flames visible." Ms. Currey's apartment was located at 5399 Hemlock Drive, which was directly across the street from the incident structure. In her deposition testimony, Ms. Currey stated that she was sitting at a table next to her sliding glass door. The sliding glass door was on the front of her apartment facing the street, so she had a direct view of the front of 5398 Hemlock Drive. She stated that she looked up and "saw smoke" coming from the back of 5398 Hemlock Drive where the two ridges of the garage roof come together. According to her deposition testimony, she assumed it was someone barbequing. In "less than a minute", however, Ms. Currey testified that the smoke transitioned to flames. She further stated that it "really took over fast" spreading up the side of the apartment building. Ms. Currey stated that she "dialed 911 right away" after seeing the flames.

The fire department arrived at 5:01 pm at which point the patio area behind garages A and B was consumed with fire. The fire had also spread up the side of the apartment building. Lewis County Sheriff's Office Sergeant Richard Knight and Deputy Brett Croneiser responded to the scene to investigate the origin and cause of the fire. Sergeant Knight arrived on scene at 5:31 pm, and Deputy Croneiser arrived on scene at 5:53 pm. Deputy Croneiser conducted the investigation with the assistance of Sergeant Knight and others who were part of the Lewis County Cause & Origin Team. Facing the front of the building, Deputy Croneiser noted fire damage to units A and B, the garage roofs, and the rear patio and contents.

In his report, Deputy Croneiser noted that the tenant of unit A, Richard Burke, was not home at the time of the incident nor was his daughter Kathleen Barker, who was visiting her 86-year old father. Unit B was unoccupied at the time of the fire and was being prepared for rental. Deputy Croneiser noted that damage to unit B was primarily from ceiling collapse and exterior exposure. During his inspection of the interior of unit A, he noted that the mechanical room was more extensively damaged when compared to other areas of the apartment. In particular, he noted extensive fire damage on the mechanical room wall near the dryer and the door leading to the patio (see Figure 1). He noted that the dryer knob was "off". After inspection on the interior, he concluded that damage inside the mechanical room was the result of "natural fire progression" into the space from the exterior of the building.

Deputy Croneiser, then, focused his attention to the patio area in the rear of unit A. The patio was open but covered by a roof structure that adjoined the garage roof. A walkway underneath the patio area extended from the exterior door of the unit A mechanical room to the

exterior door of garage A (see Figure 1). Deputy Croneiser noted that the patio roof structure had burned and collapsed during the fire and that fire had spread from the patio roof into the garage roof and up the side of the building. The investigative team excavated and reconstructed the patio area. They documented a "melted white plastic unit…located where the rear wall and concrete patio meet approximately 6 feet from the back door of the garage." They also located a melted "plastic planter" in the same area. Deputy Croneiser noted that a gas meter was in the patio area outside of the unit A mechanical room. He indicated that the meter had "blown apart on the bottom" and that the gauges were "melted out". There had been no complaint of a gas leak or odor of gas prior to the incident.

After documenting the scene, Deputy Croneiser interviewed Ms. Barker. According to Deputy Croneiser, Ms. Barker stated that she smoked a cigarette on the patio between 3:15 pm and 3:30 pm on the day of the incident. She sat on a plastic storage bench while she smoked. When she was done, she "put her cigarette out and placed it in a plastic planter that she had on the patio for cigarette butts….." More specifically, Deputy Croneiser testified at deposition that Ms. Barker wiped the cigarette in the dirt in the planter and then shoved it into that same dirt. According to Deputy Croneiser, Ms. Barker did not hear or smell natural gas when she was smoking outside.

On April 17, 2019, Deputy Croneiser received a phone call from Investigator Brian Wydra. Mr. Wydra represented that he was an investigator working on behalf of Erie Insurance Company, Mr. Burke's renter's insurance carrier. According to Mr. Wydra, he interviewed Ms. Barker, and she advised him that she was smoking in the patio area between 3:00 pm and 3:15 pm. Additionally, Mr. Wydra stated that Ms. Barker told him about a blue tarp that was hung from the patio roof "to block wind in the winter." Mr. Wydra represented to Deputy Croneiser that he found evidence of the tarp during his investigation.

Based upon his investigation, Deputy Croneiser concluded that the fire started in the exterior "CD corner" of the building. According to Deputy Croneiser deposition testimony, the C/D corner encompassed the entire patio area. He ruled out environmental factors, electrical causes, and incendiary causes, but stated that he was "not able to rule out accidental and/or smoking as a cause." In his deposition, Deputy Croneiser testified "We looked for a competent ignition source, and if Ms. Burke extinguished her cigarette in the manner in which she stated that she did, then that would rule out the smoking as a competent ignition source." In his deposition, Sergeant Knight also testified that they "were unable to come up with a competent ignition

sequence at that time or any time since we left the scene based off of the evidence present that day." Based upon the evidence, Deputy Croneiser and Sergeant Knight were not able to determine the probable cause of the fire and classified it as "undetermined".

In her deposition, Ms. Barker testified that she would visit her father once a month and that she had been visiting her father for approximately 10 days when the fire occurred. She said it would typically take her two minutes to smoke a cigarette. Routinely, she would only smoke half the cigarette before extinguishing it. When smoking on the rear patio, she testified that she would extinguish her cigarette by stepping on it, folding it in half, checking that it was not warm, and then disposing of it in a plastic planter.

While at her father's apartment, Ms. Barker testified that she was smoking cigarettes purchased by a friend from the Plattsburgh Indian Reservation. She indicated that she smoked approximately 20 cigarettes a day. Sometimes, she would smoke on the front porch and other times she would smoke on the rear patio. When smoking on the front porch, there was no receptacle for cigarettes, so Ms. Barker testified that she would follow the same procedure to extinguish the cigarette but would place the cigarette remains in her pocket thereafter. In fact, Ms. Currey, the neighbor across the street, testified that she had witnessed Ms. Barker extinguish her cigarette after smoking on the front porch. According to Ms. Currey, Ms. Barker would put the cigarette down on the ground and extinguish it with her foot or move it back and forth with her hand.

On the day of the incident, Ms. Barker testified that she smoked a cigarette in the rear patio area around 3:00 pm. She extinguished the cigarette using her normal practice of stepping on it, folding it in half, and ensuring it was no longer warm. She, then, placed the extinguished cigarette into a plastic planter that only contained the remains of other cigarettes. After finishing her cigarette, Ms. Barker testified that she went inside and read a book. Between 4:00 pm and 4:15 pm, Ms. Barker left the apartment to get her car washed and do some shopping. She left the apartment through the mechanical room door and walked through the patio area to the garage. She stated that she opened the garage and moved her car into the driveway. Then, she walked back through the patio area into the house, and then came back out of the house through the patio area again. She, then, left the residence to get her car washed at Hanno's on Route 12 in Lowville, after which she went to the Dollar General which was also in the same vicinity. While in the Dollar General, people were talking about a smoke plume that was visible in the sky, and Ms. Barker

testified that she saw fire trucks passing the store. She believed it was approximately 5:00 pm when she made these observations.

Figure 2 is a diagram of the rear patio area drawn by Ms. Barker during her deposition. According to Ms. Barker, there was a plastic storage bin against the masonry wall next to the garage (marked "S"). She would sit on this storage bin while smoking. On the other side of the patio, there was another plastic storage shelf approximately 6 feet high that had a storage container on the bottom (marked "S2"). There were approximately three green plastic chairs stacked on the corner of the patio (marked "C"), and salt and sand in various locations. Ms. Barker testified that there was a blue tarp that hung down vertically from the patio roof. The tarp was between the post marked "P2" and a third post shown as a black dot with an arrow (see Figure 2).

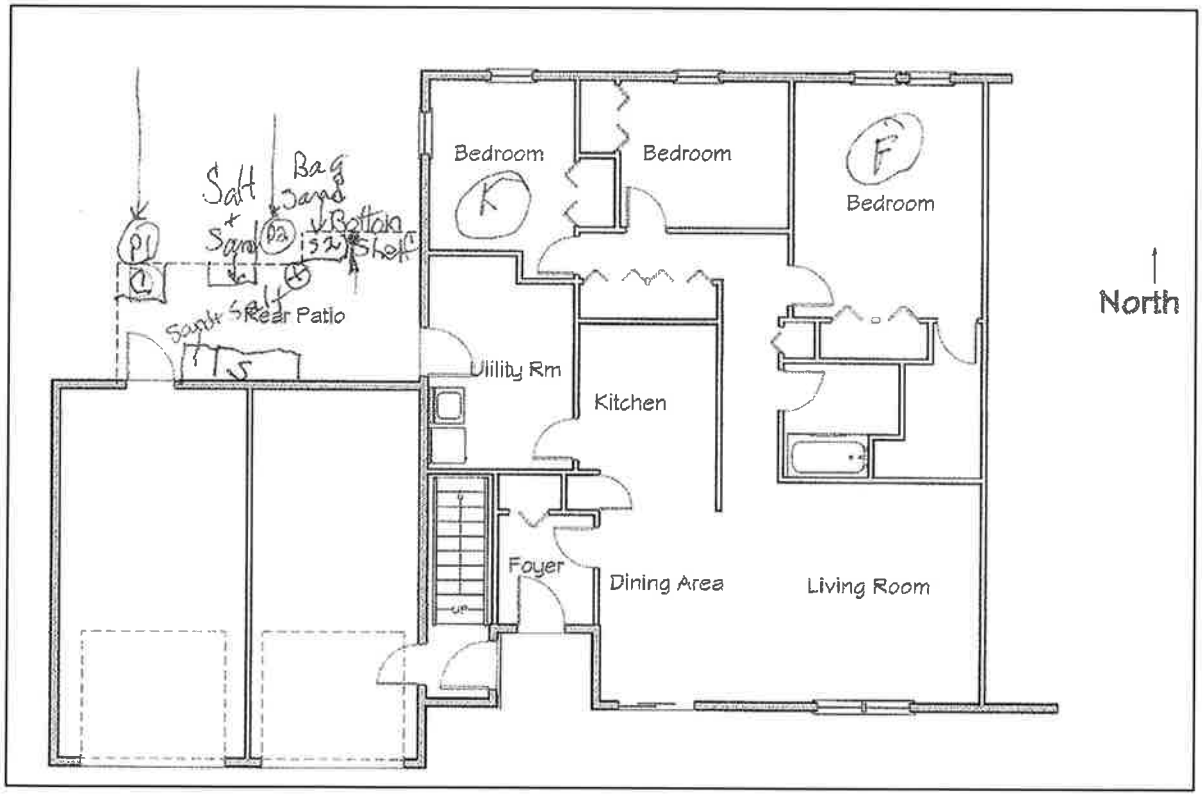

Figure 2: Diagram of rear patio from Ms. Barker's deposition.

The tarp spanned approximately six feet. The purpose of the tarp was to keep snow from drifting onto the patio area. The planter that Ms. Barker used for her cigarette butts was located directly across from the plastic storage bin (marked "X" with a circle). According to Ms. Barker, the planter was green. With regards to a white planter, Ms. Barker indicated that there were no white planters located on the patio area but there was a white planter on the opposite side of the blue tarp

in the grass. She indicated that the white planter was empty and that she never used the white planter to dispose of cigarettes. Ms. Barker testified that the planter she used for disposing of cigarettes was approximately 6 to 8 inches from the plastic storage unit and approximately 1 foot from the blue tarp. She stated that she had emptied the planter approximately three times in the 10 days she had been at the residence. Ms. Barker testified that there was approximately one inch of cigarette butts in the planter on the day of the incident.

ANALYSIS

The complaint filed in this case indicated that the fire at 5398 Hemlock Drive resulted from Ms. Barker's negligent and careless use and/or disposal of smoking materials. At issue in this case is the origin, cause, and responsibility for the fire that occurred at 5398 Hemlock Drive. Moreover, at issue is whether a carelessly discarded cigarette was the cause of this incident.

Origin

Photographs from the Lewis County Sheriff's Office investigation were reviewed to analyze the fire patterns and fire effects present at the scene. Additionally, photographs from the media and Plaintiff's expert Daniel Vieau, were evaluated. Damage to the interior of units A and B is consistent with smoke and fire spread into these locations from the exterior of the building. The unit A mechanical room was the most heavily damaged interior space. Photographic evidence shows that more extensive damage was present on the wall bordering the exterior patio. Fire effects and patterns on the mechanical room door leading to the exterior patio are consistent with heat exposure from the exterior. Additionally, damage to the dryer vent and power cord is consistent with heat transfer through the exterior opening of the dryer vent and the adjacent mechanical room door. The ruptured gas meter was located a short distance from the damaged mechanical room door and vent; the fuel expelling from the meter would have significantly contributed to the overall fuel loading on the patio area and would have contributed to the spread of the fire into the mechanical room. Damage within garage A is consistent with the drop down of burning materials from the exposed roof structure above the ceiling.

Based upon a review of the photographic evidence from the fire scene, it is probable that the fire originated in the rear patio area behind garages A and B. Due to the extent of the fire, there are no localized fire patterns which would allow one to identify a more specific area of origin

or point of origin. These conclusions are also consistent with the Lewis County Fire Investigation Teams findings and Deputy Croneiser's and Sergeant Knight's deposition testimony.

Cause

Plaintiff's expert, Mr. Vieau, has opined to a degree of certainty that the fire originated on the rear patio from a carelessly discarded cigarette. However, Mr. Vieau failed to test his cause hypothesis as required by NFPA 921. Mr. Vieau's hypothesized fire cause is not consistent with the known facts of this case or the body of scientific knowledge surrounding smoldering cigarette ignitions. The specific areas in which Mr. Vieau failed to follow NFPA 921 and the Scientific Method will be detailed in the *Rebuttal* section of this report. The *Cause* section of this report will test the hypothesis that the fire was caused by a carelessly discarded cigarette.

Studies have been conducted to evaluate the ability of smoldering cigarettes to ignite common combustibles. Holleyhead (1998) pointed out that the ability of a lit cigarette to ignite another material is dependent upon several factors including the temperature and heat output of the cigarette, the intimacy of contact between the cigarette and the material, and air flow at the point of contact. In a study on the ignition of paper materials in a trashcan by a lit cigarette, Anon (1998) found two general trends. First, the probability of a smoldering cigarette starting a fire in paper materials found in a trashcan is extremely unlikely. Second, if a smoldering cigarette does start a fire in paper materials within a trashcan, the fire will quickly transition to flaming in a matter of minutes. In Anon's study, over 300 smoldering cigarette tests were conducted in trashcans with various paper products, including fast food wrappers and other containers. Out of the 300 tests conducted, only four tests resulted in flaming combustion, and to achieve these flaming fires, highly specific conditions had to be artificially created. For example, in one test a freshly lit cigarette was strategically placed in a used popcorn bag and then the popcorn bag was packed with loose paper towels that had been used to wipe off piping grease. Other tests that achieved flaming ignition involved similarly complex cigarette and trash configurations. No fires were able to occur when a freshly lit smoldering cigarette was only dropped on top of the various trash materials.

In this incident, Ms. Barker testified that there were other cigarette butts in the plastic planter. Hence, the fuels present in the immediate vicinity where Ms. Barker discarded her cigarette were primarily composed of paper, plastic, and tobacco. While this incident does not involve the same paper materials that Anon (1998) tested, Anon's results present a best-case

scenario in which he only got flaming ignition in 4 out of 300 tests; the ignition of a thermally thin material, such as the paper materials tested by Anon requires less thermal energy than ignition of thicker materials, such as cigarette butts. Hence, if it were difficult to ignite the paper products in Anon's (1998) test, it would be equally difficult, if not more difficult, for a lit cigarette to ignite other cigarette butts. Additionally, in cases where a smoldering cigarette led to flaming ignition in a trashcan, visible smoke was observed from the beginning of the test, and visible flames were observed within 14 to 18 minutes.

To further evaluate the timeline of events in this incident, it is necessary to define the duration of time that a cigarette can smolder. Cigarette paper contains nitrates that can support continued combustion of the cigarette even when it is not being actively smoked. However, when the paper has burned down to the filter, the cigarette will extinguish. As such, there is a limited window of time during which a prematurely discarded lit cigarette can ignite adjacent materials before it is no longer an ignition source.

Krasny (1987) reported smoldering burn rates of 4 mm/min to 6 mm/min. While at her father's house, Ms. Barker testified that she smoked cigarettes that came from the Plattsburgh Indian Reservation. To evaluate the burn rate of the incident cigarettes, exemplar cigarettes where obtained from the Plattsburgh Indian Reservation. It was determined that the incident cigarettes were "Rollies" brand, as shown in Figure 3. These cigarettes are 83 mm long with 63 mm composed of tobacco and 20 mm composed of filter.

Figure 3: Rollies brand exemplar cigarette.

The exemplar cigarettes were tested in open air and against a plastic substrate (see Appendix C). In open air, it took approximately 11 minutes for the 63 mm length of tobacco to burn equating to a 5.7 mm/min burn rate. Against the plastic substrate, it took approximately 17 minutes for the 63 mm length of tobacco to burn producing a 3.7 mm/min burn rate. These burn rates are consistent with those found by Krasny (1987), e.g. 4 mm/min to 6 mm/min.

Ms. Barker testified that she routinely smoked half a cigarette and then discarded it. It is unclear if Ms. Barker smoked half the cigarette as measured from end to end or half the tobacco portion of the cigarette. Assuming a worst-case scenario where Ms. Barker discarded her cigarette with approximately 31.5 mm of tobacco remaining, e.g. half the tobacco portion, the cigarette would self-extinguish after 9 minutes using the slowest burn rate of 3.7 mm/min.

The information gathered from the literature and testing was compared against the timeline of events shown in Table 1. Table 1 was developed based upon witness testimony. Ms. Barker testified that she smoked a cigarette on the rear patio at 3:00 pm. Investigator Wydra indicated that Ms. Barker last smoked on the patio between 3:00 pm and 3:15 pm, and Deputy Croneiser indicated that Ms. Barker last smoked on the patio between 3:15 pm and 3:30 pm. Two-time increments were utilized to evaluate the earliest and latest times Ms. Barker could have smoked on the patio. Time 1 (ΔT1) represents the time lapse assuming Ms. Barker last smoked on the patio at 3:00 pm. Time 2 (ΔT2) represents the time lapse assuming Ms. Barker last smoked on the patio at 3:30 pm.

Event	Time (hr:min)	ΔT1 (hr:min)	ΔT2 (hr:min)
Earliest time Ms. Barker smoked a cigarette on patio	3:00	0:00	
Latest time Ms. Barker smoked a cigarette on the patio	3:30	0:30	0:00
Ms. Barker walks through patio area twice	4:00	1:00	0:30
Ms. Currey reports fire to 911	4:57	1:57	1:27

Table 1: Timeline of Events

As shown in Table 1, Ms. Barker walked through the patio area three times approximately 30-minutes to a 1-hour after she last smoked a cigarette. Anon (1998) found that visible smoke was observed from the beginning of his tests, and visible flames were observed within 14 to 18 minutes when a full-length cigarette was the ignition source. Hence, flaming ignition occurred at

or before the cigarette self-extinguished. Given that the incident cigarette would only smolder for 9 minutes after it was discarded, ignition of other combustibles within the planter would have occurred within this 9-minute time frame. This would have resulted in excess smoke production or flaming combustion.

The walkway between the mechanical room door and the garage door is a narrow area measuring approximately 36 inches wide. The bench that Ms. Barker sat on while smoking spanned almost the width of the walkway. The plastic planter was only a short distance from the bench. Figure 4 is the image taken by Plaintiff's expert Mr. Vieau, which shows the approximate location of the bench and the planter.

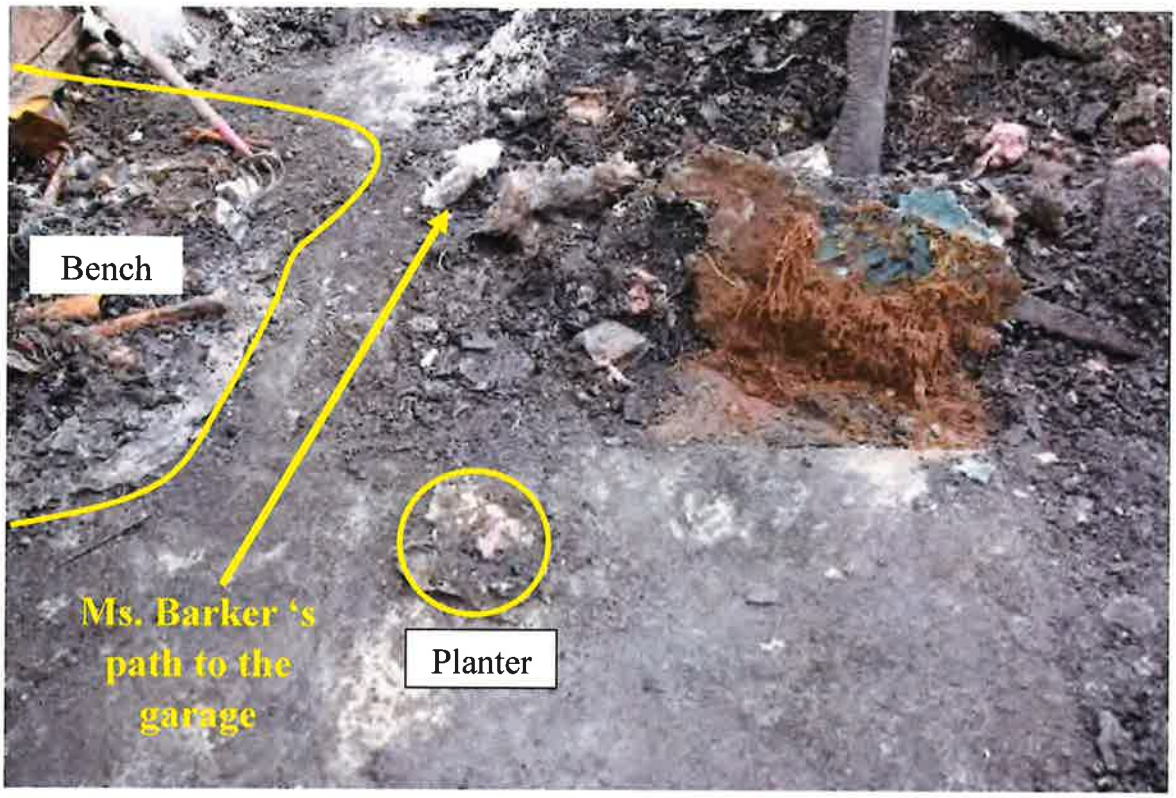

Figure 4: Path to garage between bench and planter. (Image taken by Daniel Vieau)

To pass through this area, Ms. Barker would have walked past the plastic planter. She would have done so three times as she prepared to leave the residence at 4:00 pm, almost 30 minutes to one hour after she discarded her cigarette. At no time did Ms. Barker see or smell anything unusual. She did not see flames or smell smoke coming from the planter. Additionally, smoke and fire were not witnessed for 1-1/2 to 2 hours after Ms. Barker last smoked on the patio. The timeline of events and witness observations is inconsistent with a hypothesis that a carelessly

discarded cigarette caused this fire. As such, and in keeping with the Scientific Method, this hypothesis must be rejected.

Rebuttal

NFPA 921, *Guide for Fire and Explosion Investigation*, is the de facto "standard of care" in the fire investigation community. NFPA 921, Chapter 4, Basic Methodology, recommends the use of the Scientific Method. The origin of the Scientific Method predates any edition of NFPA 921 and is a principle of inquiry that forms the basis for legitimate scientific and engineering processes, including fire incident investigation. The Scientific Method is applied to the investigation of fire and explosion incidents through the following steps: 1) Recognize the need, 2) Define the problem, 3) Collect data, 4) Analyze data, 5) Develop a hypothesis, and **6) Test the hypothesis**. A hypothesis is developed through the use of inductive reasoning, which NFPA 921 defines as "the process by which a person starts from a particular experience and proceeds to generalizations." The Scientific Method requires, however, that any hypothesis that is developed and related to the origin, cause, or responsibility for a fire must be tested by the principle of deductive reasoning, in which the investigator compares his or her hypothesis to all the known facts, as well as, the body of scientific knowledge associated with the phenomenon relevant to the specific incident.

Plaintiff's expert Mr. Vieau used inductive reasoning (e.g. generalizations) in arriving at his conclusions regarding the cause of this fire; however, he failed to use deductive reasoning to test his hypothesis against the specific facts of this case and known scientific and engineering principles. Thus, his conclusions are invalid because he failed to fully and properly apply the Scientific Method to his analysis.

As discussed in Chapter 19 of NFPA 921, "a fuel by itself or an ignition source by itself does not create a fire" and a cause cannot be inferred simply by identifying a potential ignition source within the area of origin. Moreover, NFPA 921, Section 19.4.4.1 and 19.4.4.2 states:

> **19.4.4.1** The ignition sequence of a fire event is defined as the succession of events and conditions that allow the source of ignition, the fuel, and the oxidant to interact in the appropriate quantities and circumstance for combustion to begin. Simply identifying a fuel or an ignition source by itself does not and cannot describe how

a fire came to be. Fire results from the interaction of fuel, an oxidant, and an ignition source. Therefore, the investigator should be cautious about deciding on a cause of a fire just because a readily ignitible fuel, potential ignition source, or any other of an ignition sequence's elements is identified. The sequence of events that allow the source of ignition, the fuel, and the oxidant to interact in the appropriate quantities and circumstances for combustion to begin, is essential in establishing the cause.

19.4.4.2 Analyzing the ignition sequence requires determining events and conditions that occurred or were logically necessary to have occurred, in order for the fire to have begun. Additionally, in describing an ignition sequence, the order in which those events occurred should be determined.

Mr. Vieau failed to evaluate the competency of the cigarette as an ignition source. He also failed to identify the type and form of the first fuel ignited and the circumstances that came together to start the fire. Mr. Vieau's analysis clearly suffers from presumption and expectation bias. NFPA 921 states the following with regards to these fatal flaws:

4.3.8 Avoid Presumption. Until data have been collected, no specific hypothesis can be reasonably formed or tested. All investigations of fire and explosion incidents should be approached by the investigator without presumption as to origin, ignition sequence, cause, fire spread, or responsibility for the incident until the use of the scientific method has yielded testable hypotheses, which cannot be disproved by rigorous testing.

4.3.9 Expectation Bias. Expectation bias is a well-established phenomenon that occurs in scientific analysis when investigator(s) reach a premature conclusion without having examined or considered all of the relevant data. Instead of collecting and examining all of the data in a logical and unbiased manner to reach a scientifically reliable conclusion, the investigator(s) uses the premature determination to dictate investigative processes, analyses, and, ultimately, conclusions, in a way that is not scientifically valid. The introduction of expectation

> bias into the investigation results in the use of only that data that supports this previously formed conclusion and often results in the misinterpretation and/or the discarding of data that does not support the original opinion. Investigators are strongly cautioned to avoid expectation bias through proper use of the scientific method.

With bias and presumption, Mr. Vieau improperly used inductive reasoning and invalid and unscientific logic in arriving at his conclusions regarding the fire cause. Mr. Vieau never tested his cause hypothesis against the specific facts of this case and the relevant technical literature as required by the Scientific Method, thereby, rendering his opinions invalid.

Spoliation

NFPA 921 defines spoliation as "Loss, destruction, or material alteration of an object or document that is evidence or potential evidence in a legal proceeding by one who has the responsibility for its preservation." Further, Section 12.3.5 of NFPA 921 states that spoliation of the scene "significantly impairs the opportunity of other interested parties to obtain the same evidentiary value from the evidence, as did any prior investigator." Moreover, Section 12.3.5.5 states:

> **12.3.5.5 Documentation Prior to Alteration.** Anytime the investigator determines that significant alteration of the fire scene will be necessary to complete the fire investigation, it should be done, only after notification to all known interested parties has been given, and the interested parties have been afforded the opportunity to be present. Special care should be taken to photograph and document the scene and preserve relevant evidence. The scene should be properly documented prior to any alteration, and relevant evidence should be preserved. Destructive disassembly of any suspected or potential ignition sources should be avoided whenever possible to permit later forensic examination after notice is given to all known interested parties.

In this case, the ability to evaluate all hypotheses regarding the cause of the fire have been prejudiced by spoilation. Plaintiff's expert, Mr. Vieau opined that "the only identifiable ignition sources were from electrical fault or failure of incandescent recess light fixtures or from the careless discard of smoking material (cigarette)." Mr. Vieau further opined that "The incandescent recess light fixtures recovered from the debris had failed to reveal any evidence of electrical damage (i.e. arcing) or isolated oxidation patterns." Plaintiff has produced two photographs, shown in Appendix D, of what appears to be the remains of one incandescent light. These photographs provide no close-up details of the light or electrical wiring associated with the light which would allow for an independent evaluation of the evidence. Further, no evidence from the fire scene, including the lighting, was retained for inspection by Ms. Barker's representatives. Moreover, when the investigator retained by Ms. Barker's insurance company (Bill Haynes of Sotera Investigative Group) went to the scene, the patio area and garages had been demolished and removed. As such, defendant's experts have not been provided the same opportunity to examine the physical evidence. Because of this limitation, the hypothesis regarding the light fixtures as an ignition source cannot be tested or challenged.

SUMMARY OF OPINIONS

The following conclusions can be made to a reasonable degree of engineering and scientific certainty based upon the analysis presented above:

- It is probable that the fire originated in the rear patio area behind garages A and B.
- Due to the extent of the fire, a more specific area of origin or point of origin cannot be identified.
- To test the hypothesis that a carelessly discarded cigarette started this fire, it is necessary to establish the duration of time a cigarette will smolder.
- Based upon testing of exemplar cigarettes, the incident cigarette would have self-extinguished after 9 minutes.
- Ignition of other combustibles within the planter would have occurred within this 9-minute time frame resulting in excess smoke production or flaming combustion.
- Ms. Barker walked past the plastic planter three times as she prepared to leave the residence almost 30 minutes to one hour after she discarded her cigarette.

- Ms. Barker did not see flames or smell smoke coming from the planter at any time as she walked past it.
- The timeline of events and witness observations is inconsistent with a hypothesis that a carelessly discarded cigarette caused this fire.
- The carelessly discarded cigarette hypothesis must be rejected because it is inconsistent with the facts of this case and known scientific and engineering principles
- Mr. Vieau failed to use deductive reasoning to test his hypothesis against the specific facts of this case and known scientific and engineering principles.
- Mr. Vieau's conclusions regarding the cause of this fire are invalid, because he failed to fully and properly apply the Scientific Method to his analysis.
- Due to spoliation, defendant cannot examine the physical evidence and cannot challege or test other cause hypotheses.
- Since no hypothesis can withstand an examination by deductive reasoning, the cause remains undetermined.

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NFPA 921, "Guide for Fire and Explosion Investigations," 2017.

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APPENDIX A: RESUME

JAMIE MCALLISTER, Ph.D., P.E., C.F.I., C.S.P.

EDUCATION:

Ph.D., Toxicology, University of Maryland, School of Medicine, Baltimore, MD, 2010.
M.S., Fire Protection Engineering, University of Maryland, School of Engineering, College Park, MD, 2002.
B.S., Fire Protection Engineering, University of Maryland, School of Engineering, College Park, MD, 2000.

DOCTORAL THESIS:

Ferrino-McAllister, J. "Fire Victim Blood Cyanide Stability and the Development of a Cyanide Uptake Model", University of Maryland, Baltimore, May 2010.

MASTER THESIS:

Ferrino, J. "An Investigation of Fire Phenomena in Residential Electrical Wiring and Connections", University of Maryland, College Park, December 2002.

PROFESSIONAL EXPERIENCE:

FireTox, LLC, New Market, MD, 2017 to present.

Technical Director, Principal Engineer and Toxicologist

Responsible for managing daily business operations including litigation and fire protection engineering services, as well as research and training initiatives. Serve as lead forensic investigator and expert witness for fire, combustion, and toxicological incidents. Serve as the principal investigator on fire science research projects including those associated with occupational safety and health, combustion toxicity, fire investigation, and fire service training. Serve as principal fire protection engineer on design projects involving complex structures and systems, performance-based approaches, fire modeling, and tenability analyses. Serve as the lead instructor for fire death/injury and fire investigation training courses.

Combustion Science & Engineering, Inc., Columbia, MD, 2000 to 2020.

Consulting Engineer/Toxicologist **(8/2013 to 2/2020)**

Responsible for the evaluation of issues related to fire, combustion, and toxicological incidents. Conduct fire hazard analysis, forensic failure investigations, post-fire reconstruction analyses, victim toxicological analyses, computational fluid dynamics fire modeling, fire dynamics analyses, case-related large and small-scale experimentation, fire alarm and suppression system failure analyses including re-design, and building and fire code compliance reviews. Serve as an expert witness on fire litigation cases with experience spans a broad range of both criminal and civil cases.

Principal Engineer/Toxicologist **(5/2010 to 7/2013)**

Responsible for managing the fire investigations unit and acting as a lead scene investigator and expert witness. Directed, managed, and conducted fire, combustion, and toxicological incident investigations. Directed, managed, and conducted engineering fire hazard analyses and forensic failure investigations to prevent and/or explain fires, explosions, and toxicological incidents. Directed, managed, and conducted post-fire reconstruction analyses, victim toxicological analyses, computational fluid dynamics fire modeling, fire dynamics analyses, case-related large and small-scale experimentation, fire alarm and suppression system failure analyses including re-design, and building and fire code compliance reviews. Directed, managed, and conducted investigations of carbon monoxide poisoning incidents from combustion devices. Additional areas of focus included fire department operations as it related to fire spread, damage, and pattern development, and drug and alcohol effects as it related to victim impairment. Served as an expert witness on fire litigation cases with experience spans a broad range of both criminal and civil cases.

Senior Engineer **(1/2007 to 4/2010)**
Performed the duties previously described under "*Project Engineer*" as well as directed and managed other Project Engineers in the performance of the same duties. Served as an expert witness in fire litigation cases.

Project Engineer **(12/2002 to 12/2006)**
Performed origin and cause investigations; Conducted engineering fire hazard analyses and forensic failure investigations to prevent and/or explain fires and explosions; Oversaw post-fire reconstruction and laboratory testing; Performed code review, fire modeling (CFAST and FDS), fire dynamics analyses, carbon monoxide poisoning analyses, and fire victim toxicological analyses.

Staff Engineer **(12/2000 to 11/2002)**
Performed origin and cause investigations and the duties previously described under "*Engineering Technician*" in a full-time capacity; Designed (in addition to conducting) laboratory tests for litigation support and research and development; Performed code reviews, fire modeling (CFAST and FDS), and fire dynamics analyses for litigation support.

Engineering Technician **(5/2000 to 11/2000)**
Assisted lead origin and cause investigators in the investigation of residential, commercial, industrial, and vehicular fires; Conducted laboratory experiments for the purposes of post-fire reconstruction analyses and product failure analyses in conjunction with fire litigation; Conducted laboratory experiments for the purposes of fire modeling validation; Conducted laboratory experiments for government-funded and corporate-funded research and development; Responsible for designing data acquisition programs, constructing small and large-scale test compartments, and instrumenting compartments with thermocouples, heat flux gauges, and gas probes.

National Institute of Standards and Technology, Gaithersburg, MD, 2013 to 2020.

Supervisory Fire Protection Engineer and NIST Authority Having Jurisdiction **(8/2015 to 1/2020)**
Performed the duties previously described under "*Fire Protection Engineer.*" Performed the duties of the NIST Authority Having Jurisdiction for all NIST-owned and operated campuses including those located in Gaithersburg, MD, Boulder, CO, Fort Collins, CO, Charleston, SC, and Kauai, HI. Supervised and lead the Office of Safety, Health, and Environment, Fire & Facilities Safety Group composed of fire protection engineers, an electrical safety engineer, and a fire alarm system administrator. Developed the NIST Fire and Life Safety Program and implemented code adoptions, policies, and programs related to fire, life, and electrical safety applicable to all NIST campuses. Ensured campuses were complying with the requirements set forth in the International codes, NFPA codes, best practices adopted by NIST, and relevant OSHA regulations. Assisted the NIST workplace inspection team in identifying and remediating fire and life safety hazards identified in office, laboratories, and various other occupancy types. Managed contracts for fire alarm programming and fire alarm and suppression system inspection, testing, and maintenance on the NIST Gaithersburg and Boulder campuses. Graduated from the NIST New Leader Program and obtained certifications as a Certified Safety Professional and Level 2 Contracting Officer's Representative.

Fire Protection Engineer **(8/2013 to 7/2015)**
Conducted laboratory hazard assessments to identify safety concerns related to usage of hazardous chemicals such as flammable, combustible, toxic, pyrophoric, explosive, and reactive gas, liquids, and solids. Provided requirements to eliminate or protect against hazards associated with laboratory research including implementation of monitoring devices, fire suppression and detection systems, and personal protective equipment. Reviewed design and construction submittals for renovations and small- and large-scale construction projects on NIST campuses to ensure compliance with regulatory codes. Provided fire and life safety system design services to NIST. Acted as the lead investigator of fire and electrical incidents occurring on NIST campuses.

University of Maryland, College Park, MD, 2014 to present.

***Lecturer* (1/2014 to present)**
Instructor for the School of Engineering, Fire Protection Engineering Online Graduate Program. Responsibilities include educating graduate students on topics related to human behavior, people movement, life safety, heat and toxic species production, and tenability in fires.

***Fire Laboratory Technician* (9/1999 to 5/2000)**
Used the cone calorimeter, performed flammability characteristics calculations. Conducted research project in conjunction with the National Institute of Standards and Technology studying burning characteristics of gypsum wallboard with varying layers of paint (over 150 tests). Research was published in "Flammability of Oil-Based Painted Gypsum Wallboard Subjected to Fire Heat Fluxes" by Dr. Mowrer and presented at the 2001 NFPA World Fire Safety Congress and Exposition.

Eastern Kentucky University, Richmond, KY, 2010 to 2018.

***Instructor/Facilitator* (8/2010 to 5/2018)**
Online instructor and facilitator for Fire Protection Administration and Fire Protection and Safety Engineering Technology Programs. Responsibilities included educating undergraduate students on topics related to fire behavior, combustion sciences, and the use of statistics in fire safety analyses.

University of Maryland, University College, Adelphi, MD, 2008 to 2017.

***Associate Professor* (8/2014 to 12/2017)**
Instructor for the Mathematics Departments. Responsibilities included educating undergraduate students on topics related to collegiate mathematics. Promotion to Associate Professor is based on years of service, as well as, relevant and effective service and support of institutional academic rigor.

***Assistant Professor* (4/2008 to 7/2014)**
Instructor for the Fire Science and Mathematics Departments. Responsibilities included educating undergraduate students on topics related to fire origin and cause investigation, fire behavior, fire ignition, fire growth and spread, and legal considerations in fire investigation, as well as, mathematics.

Stanton Engineering, Laurel, MD, 1999 to 2000.

***Engineering Technician,* (11/1999 to 5/2000)**
Used National Fire Codes, specifically NFPA 13, 72, and 101. Performed life safety analyses, fire alarm and sprinkler system design, fire modeling, and fire risk assessment. Notable projects: The Pentagon, United States Naval Academy, The Smithsonian Institute. Used *Microstation*

Tilley Fire Equipment Company, Doylestown, PA, 1999.

***Sprinkler System Designer/Engineering Technician* (5/1999 to 8/1999, Summer Internship)**
Used National Fire Codes, specifically NFPA 13, 13D, and 13R. Designed retrofit, tenant finish, and new sprinkler systems. Performed field checks, surveyed installation and fabrication. Assessed blueprints, cut sheets, fabrication reports, and hydraulic calculations. Used *Autocad* 14 w/ *SprinkCad.*

ABB Power Products, Montgomeryville, PA, 1997-1998.

***Technician* (1997 to 1998)**
Responsible for inventory and assembly of electrical power generation, transmission, and distribution equipment including circuit breakers, transformers, switchgear, controls, and relays.

RELATED EXPERIENCE:

Contract Instructor: National Fire Academy, Emmitsburg, MD

Reviewer: Fire Technology, Fire Safety Journal, International Association of Fire Safety Science, and Brady Publishing

Subject Matter Expert: Department of Defense- Toxic (Fire) Gas Inhalation Injury (BIPTAP), Society of Fire Protection Engineering- Guide on Human Behavior in Fire, DHS/FEMA/USFA Practical Applications of Fire Dynamics and Modeling

Colmar Vol. Fire Company (July '95- December '00)
Position(s) Held: Firefighter
Beltsville Vol. Fire Department (Station 41)/Prince George's County Fire Department (Oct '98-Jan '03)
Position(s) Held: Firefighter/EMT
West Lanham Vol. Fire Department (Station 48)/Prince George's County Fire Department (Jan '03-June '03)
Position(s) Held: Firefighter/EMT
Morningside Vol. Fire Department (Station 27)/Prince George's County Fire Department (June '03-Present)
Position(s) Held: Firefighter/EMT, Apparatus Driver/Operator, Lieutenant, Vice President, Life Member, Recruitment/Retention Team Member, New Apparatus Design/Procurement Committee Member, Grant Committee Chairperson, and By-Law Committee Chairperson.

Fire Department Certifications: Firefighter Level I & II, Emergency Medical Technician, Hazardous Materials Technician, Rescue Technician (Vehicle, Trench, Structural Collapse), Emergency Vehicle Operator, Pump Operator, Fire Service Instructor I & II, NFA Fire/Arson Origin and Cause Investigation.

PRESENTATIONS/LECTURERS/APPEARANCES:

"Electrical Fire Research" presented at NFPA 921 Committee Meeting, Tucson, AZ, February 2002.

"Arson Investigation" segment, Fox 5 News, WTTG-DC, May 2005.

"Comparison of Gasoline Weathering on Carpet Samples Exposed to Various Thermal Environments", presented at International Symposium on Fire Investigation Science and Technology, Cincinnati, OH, June 2006.

"The Extent of Evaporation of Ignitable Liquids Under Exposure to Compartment Fires, Non-Fire Thermal and Non-Thermal Environments" presented at Fire and Materials, San Francisco, CA, January 2007.

"Smoke Detection Systems, Fire Modeling, and Fire Toxicology: Useful Tools in Fire Investigation and Reconstruction," presented at Cozen O'Connor Continuing Legal Education seminar, Philadelphia, PA, April 2007.

"Application of Fundamental Principles", presented at International Association of Arson Investigators Conference, Denver, CO, April 2008.

"Applications of Forensic Toxicology in Fire Origin and Cause Determination", presented at the Society of Fire Protection Engineers Professional Development Conference, Charlotte, NC, October 2008.

"The Use of Forensic Toxicology in Fire Origin and Cause Determination", presented to the Advanced Fire Investigation Class, Montgomery College, Rockville, MD, February 2009.

"Forensics: You Decide- Up in Flames", Season 1, Episode 3, Investigation Discovery, Discovery Channel, August 2009.

NFPA 921: Guide to Fire and Explosion Investigation; Session 1: Electricity and Fire, Session 2: Fire and Explosion Deaths and Injuries, presented to the Office of the Maryland State Fire Marshal, February 17, 2010 and March 3, 2010.

"Burned: Arson Investigation Evidence Changes with Science", 20/20, ABC News, May 7, 2010.

"Forensic Toxicology in Fire Investigation: The Kristine Bunch Case Study", presented to the Society of Fire Protection Engineers, Beltsville, MD February 8, 2011.

"The Scientific Method and a Case of Arson-for-Hire", presented at the Circumstantial Arson Case: Investigative Techniques and Strategies Seminar, King of Prussia, PA, February 9, 2011.

"Fire Related Deaths and Injuries: The Use of Toxicological Data in Fire Origin and Cause Determination", presented at the National Fire Academy, Emmitsburg, MD, March 19, 2011, April 19, 2011, June 28, 2011.

"Fire Related Deaths and Injuries: The Use of Toxicological Data in Fire Origin and Cause Determination", presented at the International Association of Arson Investigators, NC/SC Chapter Training Conference, Myrtle Beach, SC, October 20, 2011.

"Toxicology in Fire Investigation", presented at the International Association of Arson Investigators, Annual Training Conference, Dover, DE, April 25, 2012.

"Practical Applications of Fire Dynamics and Modeling", presented at the National Fire Academy, Emmitsburg, MD, August 21st-23rd, 2012 and December 2nd- 7th, 2012.

"Fire Death Investigations", presented at the Collin County Fire & Arson Investigation Association- 3rd Annual Forensic Fire Death Investigations Course, Huntsville, TX, September 21, 2015.

"Fire Dynamics for Beginners", presented as a Webinar for the National Association of Subrogation Professionals, February 16, 2018.

"Forensic Toxicology: Furthering Fire Causation Analysis with Medical Evidence", presented at the Maine Event, Portland, ME, July 26, 2018.

"The Scientific Method in Fire Death Investigation" and "The Impact of Drugs and Alcohol in Fire-Related Death" presented at the International Association of Arson Investigators, Oregon Chapter 31, Advanced Arson Seminar, Newport, OR, September 19, 2018.

"Fire and Emergency Service Personnel Knowledge, Skills, and Maintaining Proficiency", National Fire Protection Association, Fire Protection Research Foundation Workshop, Quincy, MA, October 1st and 2nd.

PROFESSIONAL CERTIFICATIONS:

Registered Professional Engineer (Fire Protection), State of Delaware, License # 13162 (2004-present)
Registered Professional Engineer (Fire Protection), State of Maryland, License #39570 (2010-present)
Certified Fire and Explosion Investigator, National Association of Fire Investigators, Registration # 10121-4644 (2004-2012)
Certified Fire Investigator, International Association of Arson Investigators, Certification #53-120705 (2009-present)
Associate Safety Professional, Board of Certified Safety Professionals, Certification # ASP-25757, (2016-2017)
Certified Safety Professional, Board of Certified Safety Professionals, Certification # CSP-33215, (2017-present)
Contracting Officer's Representative- Level I, Federal Acquisition Institute (2016-2018)
Contracting Officer's Representative- Level II, Federal Acquisition Institute (2018-2020)
International Firestop Council- Firestop Inspector Certification (2020-present)

PROFESSIONAL AFFILATIONS:

Current
Member, Board of Certified Safety Professionals (BCSP)
Member, International Association of Arson Investigators (IAAI)
Member, International Code Council (ICC)

Member, National Fire Protection Association (NFPA)
Member, Society of Forensic Toxicology (SOFT)
Member, Society of Fire Protection Engineers (SFPE)

Past
Friend, NFPA 921, Guide for Fire and Explosion Investigations
Committee, NFPA 720, Standard for the Installation of Carbon Monoxide Detection and Warning Equipment
Committee, ISO/TC 92/SC3, Fire threat to people and the environment
Member, Society of Toxicology (SOT)
Member, International Association for Fire Safety Science (IAFSS)
Member, Technical Working Group for Fire and Explosives (TWGFEX)

PUBLICATIONS:

Ferrino-McAllister, J., Roby, R.J., Milke, J., "Heating of Electrical Contacts: Characterizing the Effects of Torque, Contact Area, and Movement on the Temperature of Residential Receptacles", Fire Technology, Volume 42, No.1, January 2006, pp. 49-74.

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Ferrino-McAllister, J.L., Carpenter, D., Roby, Richard, "Comparison of Gasoline Weathering on Carpet Samples Exposed to Various Thermal Environments", Proceedings from the 2nd International Symposium on Fire Investigation Science and Technology, Cincinnati, OH, 2006.

Ferrino-McAllister, J.L, Carpenter, D., Roby, R., Torero, J., "The Extent of Evaporation of Ignitable Liquids Under Exposure to Compartment Fires, Non-Fire Thermal and Non-Thermal Environments", Proceedings from the 10th International Conference, Fire and Materials, San Francisco, CA, 2007.

McAllister, J.L., Roby, R., Levine, B., Purser, D., "Stability of Cyanide in Cadavers and in Postmortem Stored Tissue Specimens, a Review", Journal of Analytical Toxicology, Volume 32, Number 8, pp. 612-620, October 2008.

Goodman, A., Schooler, C., McAllister, J.L., "Physical Characteristics of Non-Energized and Energized Cables in Scaled Compartment Fires" Proceedings from the International Symposium on Fire Investigation Science and Technology, College Park, MD, 2010.

McAllister, J.L., Roby, R., Levine, B., Purser, D., "The Effect of Sodium Fluoride on the Stability of Cyanide in Postmortem Blood Samples from Fire Victims", Forensic Science International, Volume 209, pp. 29-33, May 2011.

Roby, R., McAllister, J.L., "Forensic Investigation Techniques for Inspecting Electrical Conductors Involved in Fire", United States Department of Justice, Document No. 239052, July 2012.

Hussain, N., McAllister, J.L., Roby, R., "Analysis of Beads Formed on Energized and Non-Energized Electrical Copper Conductors Exposed to Various Thermal Insults", Proceedings from the International Symposium on Fire Investigation Science and Technology, College Park, MD, 2012.

McAllister, J.L., Carpenter, D.J., Roby, R.J., Purser, D. "The Importance of Autopsy and Injury Data in the Investigation of Fires", *Fire Technology*, November 2014, Volume 50, Issue 6, pp. 1357-1377.

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McAllister, J. & McAllister, B. (2019). "Fire and Emergency Service Personnel Knowledge and Skills Proficiency", Fire Protection Research Foundation, Quincy, MA.

McAllister J., Kunsman G.W., Levine B.S. (2020) Carbon Monoxide/Cyanide. In: Levine B., KERRIGAN S. (eds) Principles of Forensic Toxicology. Springer, Cham. https://doi.org/10.1007/978-3-030-42917-1_30

APPENDIX B: LIST OF TESTIMONY

Deposition Testimony (Last 4 years):

Glenn Paul Jensen v. Elite Mechanical Systems, LLC.
In District Court of the State of Minnesota, County of Brown, Fifth Judicial District
Court File No. 08-cv-15-33
February 4, 2016

Vincent Williams et al v. Miriam Lucia Gomez and Country Lane Condominium
In the Circuit Court of the 11th Judicial Circuit in and for Miami-Dade County, Florida
Case No.: 2014-014979 CA 30
July 20, 2016

Harper v LQ Management L.L.C., et al
In the District Court of Bexar County, Texas
Cause No. 2014CI09906
March 30, 2017

Donald Lackey et al. v Walter Kidde Portable Equipment, Inc.
In the State of Rhode Island Superior Court, Providence
C.A. No.: PC 12-0110
May 11, 2017

Sabrina Archey et al. v R. Stephen McGinnis et al.
In the Commonwealth of Kentucky, Greenup Circuit Court
Civil Action 16-CI-00068
June 22, 2018

Escamilla et al v Firetrol Protection Systems et al.
In the District Court of Bexar County, Texas
Cause No. 2016CI07805
February 28, 2019

White et al. v FCA US, LLC et al.
In the United States District Court in the Eastern District of Michigan, Southern Division
Case No: 2:17-CV-12320
July 1, 2019

Touse v Jiffy Plumbing & Heating, Inc. et al
In the Circuit Court of Maryland for Prince George's County
Case No: CAL 19-14285
July 8, 2020

Trial Testimony (Last 4 years):

No trial testimony within the last four years

APPENDIX C: EXEMPLAR CIGARETTE PHOTOGRAPHS


UPS NEXT DAY AIR SAVER
1P
MD 217 1-40
NEW MARKET MD 21774
HALO - RDC


12 x 9 x 4
ULINE

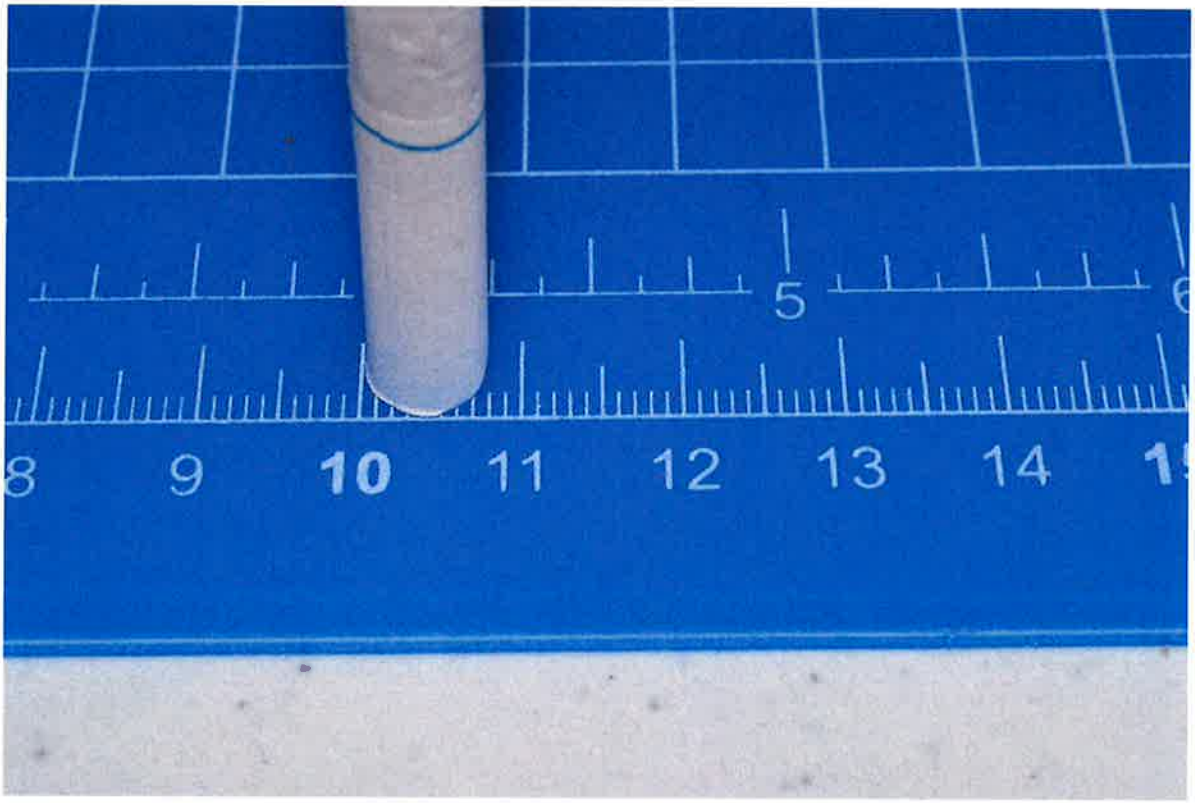

Express Pac
Extremely Urgent


ups

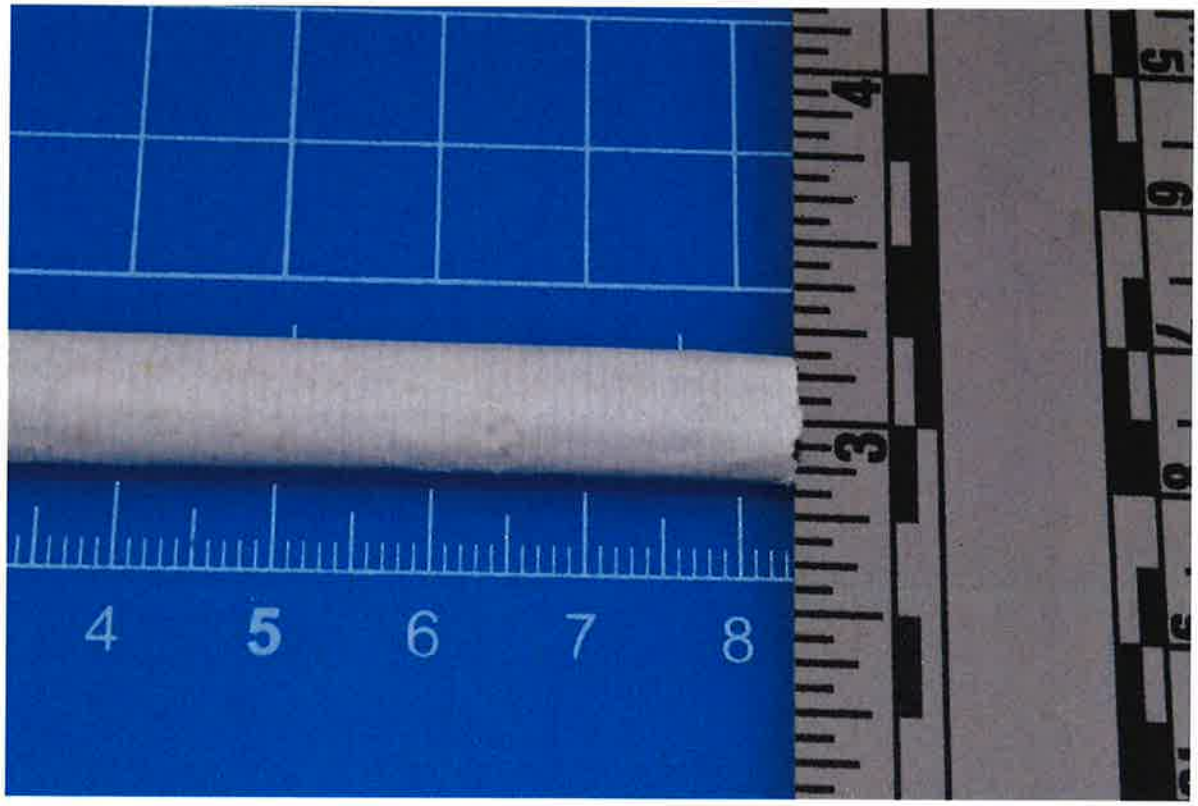

M SEIDEL
9-23-2020
CUTTING MAT


NING BOARD
FROM FIRE
TO THE SUN
DE IN TAIWAN
0 1 2 3 4 5 6 7 8 9 10
36 37 38 39 40 41 42
1 2 3 4


CUTTING MAT
45 x 30 (cm)
MADE IN TAIWAN
0 1 2 3 4 5 6 7 8 9 10 11 12 13
30 31 32 33 34 35 36 37 38 39 40 41 42


5
8 9 10 11 12 13 14

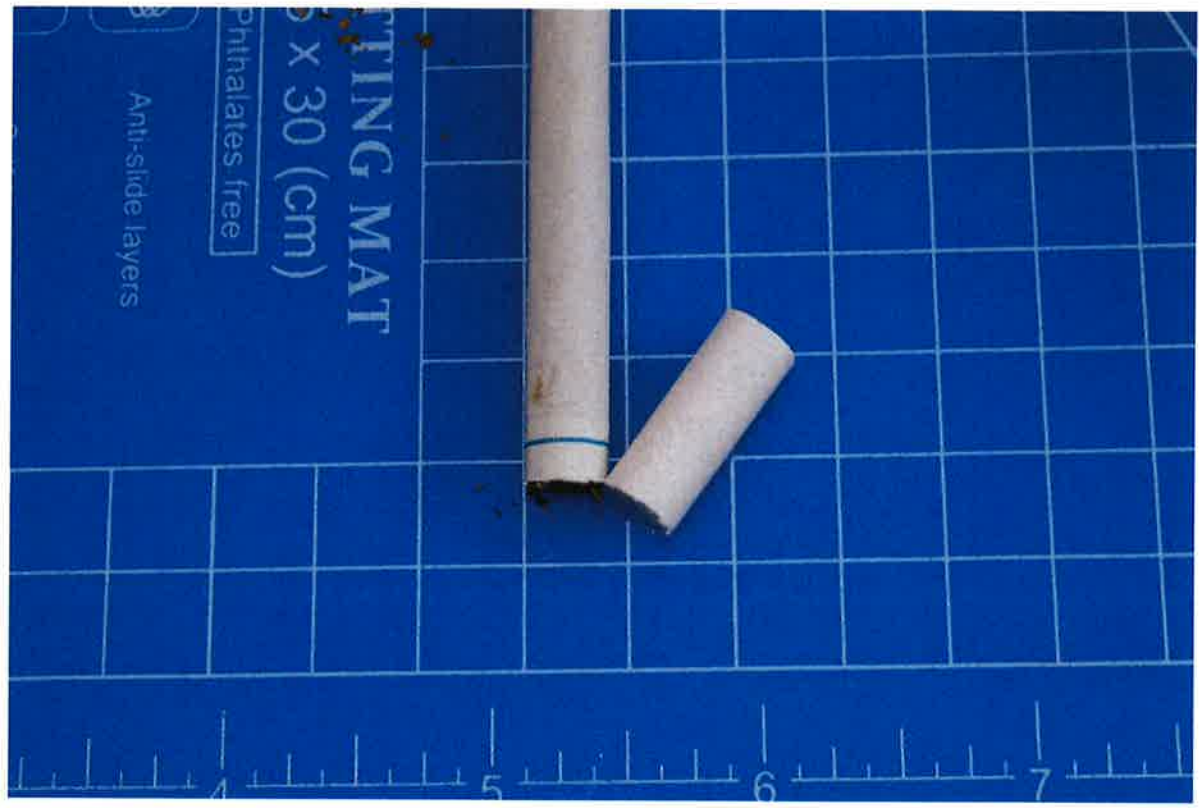

NG MAT
30 (cm)
Anti-slide layers
Self-healing
100% Eco-friendly material
MADE IN TAIWAN
4
34 35 36 37 38 39 40 41 42
0 1 2 3 4 5 6 7 8 9 10 11


4
5
6
7
8


38
39
40
41
42
0
1
2
3
4
5


MADE IN TAIWAN
AWAY FROM FIRE
POSED TO THE SUN
Self-healing
material
35 36 37 38 39
42
0 1 2 3 4 5 6 7 8 9


4 5 6
11 12 13 14 15 16


TING MAT
x 30 (cm)
Phthalates free
Anti-slide layers
5
6
7


BOARD
M FIRE
E SUN
TAIWAN
37
38
39
40
41
42
0
1
2
3
4
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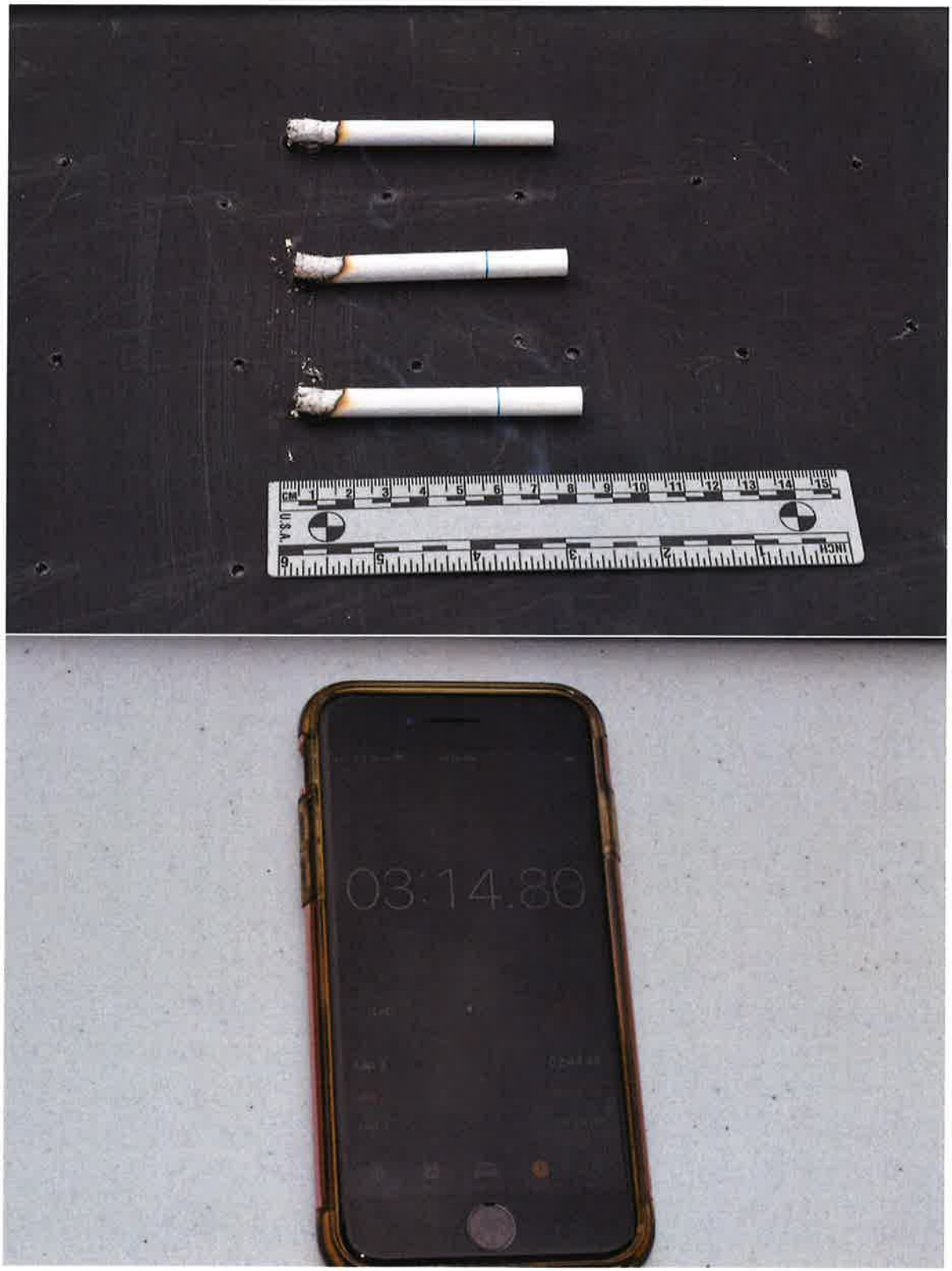
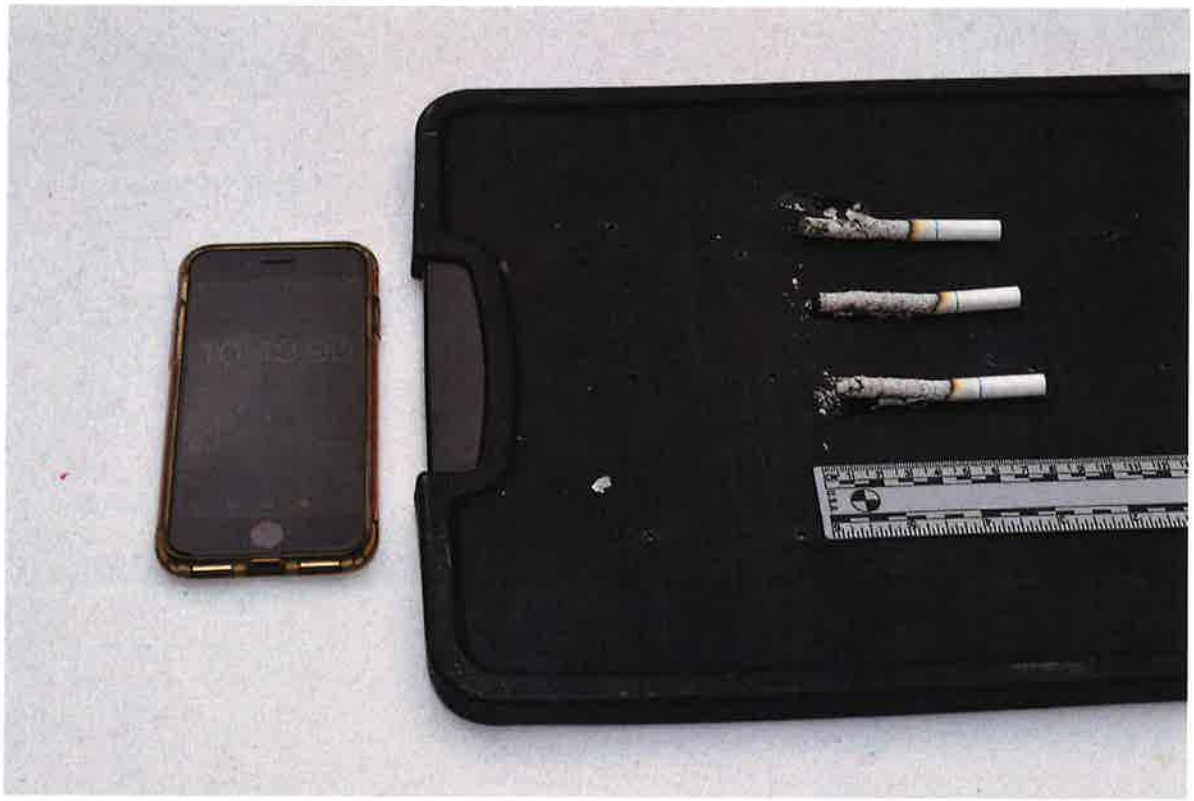
01:42.45


CM 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
U.S.A.
INCH
03:14.80




11:42.50


11:52.28


14:03.97


16:06.48

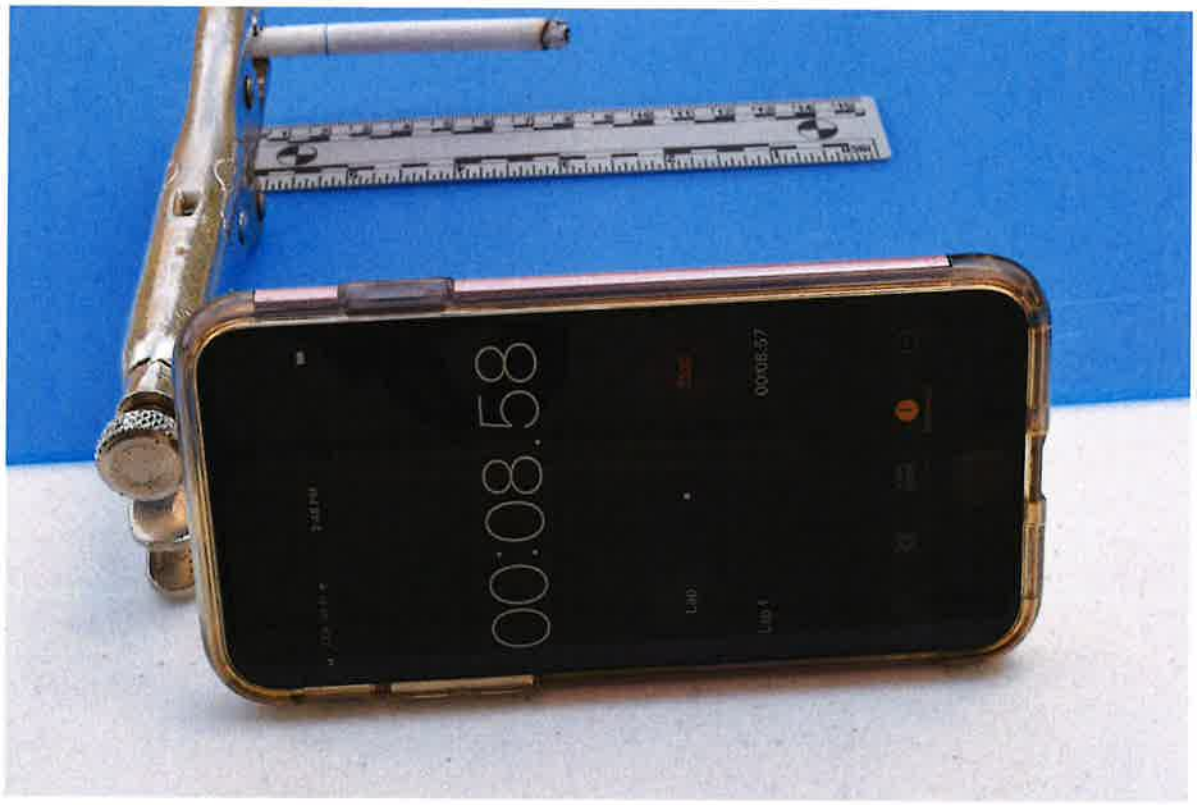

0031.81


03:24.16


07:46.00


09:52.22
09:52.22
INCH


CM
U.S.A.


00:08:58


02:50:58


05.24.77


10:16.63


12:04.80

APPENDIX D: VIEAU PHOTOGRAPHS OF LIGHT FIXTURE

Photograph #112

Photograph #113

weight testing failed to reveal the explosive tendencies. In fact, it readily ignites and explodes from friction or impact.

Christmas trees, artificial

The only US standard for testing artificial Christmas trees is UL 411[301]. This includes several tests intended for determining if branches can be directly ignited by faulty electrical lights or wiring, plus a full-scale fire test. It would take an exceptionally flammable plastic material to fail the test portions that simulate electric faults, but the full-scale fire test, on the other hand, is a reasonably tough test. In this test, 0.454 kg shredded newspaper is dispersed at the base of the tree in an 0.61 m circle and is ignited at 4 locations. Failure is declared if the specimen shows flames more than 0.91 m above the top of the tree, if later flame spread takes place in the tree, so that portions not directly over the ignition source catch fire, or if flaming molten drops continue flaming upon hitting the floor. This test simulates ignition from burning gift packages, decorations, or wrappings at the base of the tree. The test was withdrawn in 2002 due to non-use. Currently, artificial Christmas trees sold in the US are largely foreign-made, and these manufacturers have not been submitting products for UL listing, although some of them, in fact, can meet the UL 411 requirements.

Most artificial Christmas trees and properly moist natural ones will resist direct ignition from an electrical source. But ignitions from defective electrical lights or wiring do occur and these are understood to generally take place as a two-stage event. The initial electrical fault produces burning or hot material that drops onto combustibles under the tree. These combustibles, once ignited, then function much like the shredded newspaper source in the UL 411 test to ignite the tree itself. In general, a tree which would not ignite from flames applied onto branches can often ignite and burn vigorously when a burning object is placed underneath it.

Natural Christmas trees are covered under *Forest materials, vegetation, and hay*.

Cigarettes and cigars

Cigarettes are the most common form of ignition which occurs with upholstered furniture and beds; it is also a common source of ignition for a wide variety of other fires. A CPSC study[302] on residential fires initiated from cigarettes gave the results shown in Table 20. The products first ignited in cigarette fires were studied by NFPA[303], as shown in Table 21. The role of cigarettes as an ignition source has been reviewed by Holleyhead[304].

A commercial cigarette[305] typically weighs 0.6 – 1.1 g, is 7.8 to 8.1 mm in diameter, and has a length of 60 to 100 mm. In one series of tests[306] the burn times for 22 different cigarette packings were measured in the range of 11 – 18 min and, surprisingly, there was no relation to length of cigarette—the shortest cigarette (70 mm) burned longer than did any 100 mm cigarettes. In another study, however

Table 20 Materials first ignited in residential fires caused by cigarettes

Material first ignited	Percent
cotton, rayon, or cotton fabric or finished goods	54.3
man-made fabric or finished goods	13.7
untreated, uncoated paper	9.6
fabric, textile or fur, details unknown	3.7
sawn wood	3.2
polyurethane	1.6
tobacco	1.4
multiple items	1.4
PVC	1.2
plastic, unknown type	0.9
other (each less than 0.7%)	6.7
unknown material	2.3

Table 21 Product first ignited by cigarettes (data from 542 fires in 8 US cities during 1991-1992)

Product first ignited	Percent
mattress or bedding	45.4
upholstered furniture	25.4
trash	8.3
clothing	3.5
floor covering	2.5
papers	1.4
curtain or drapery	1.2
multiple items	1.2
structural element or framing	1.1
box or bag	1.1
other known products	7.8
unknown	1.1

burning times of 23 – 29 min were found for 100 mm cigarettes[307]; an extreme duration of 34 min has been reported[308]. The heat output of a cigarette that is not being actively puffed is 4 to 6 W. The autoignition temperature[1418] of tobacco subject to modest air flow velocities below 1 m s^{-1} has been found to be 210°C. The peak gas temperature inside the cigarette is 800 – 850°C, however values of 700 – 750°C are more representative of larger portions of the combustion zone. When a cigarette is smoldering and is not being puffed, temperatures drop by about 100°C[309]. The temperatures measured on the solids are higher than what is measured in the gas phase. For a puffed cigarette, temperatures of up to 850 – 950°C are found on the solid 'coal'[309,310]. A temperature of 1110°C has been reported at an unidentified measuring location[311]. By use of optical measurement techniques, extremely small zones of 1200°C temperature have been found during puffing[312], the small size, however, makes it unlikely to be of importance in ignition problems. For a cigarette placed on a horizontal surface, the temperature recorded at the cigarette/substrate juncture is about 630 – 690°C in the case of an insulating material such as upholstered furniture. In the case of a dense, hard surface, e.g., calcium silicate board, values of 370 – 470°C are found. The peak heat flux[313] from a cigarette to that surface is about 50 – 60 kW m^{-2}. Users tend to

discard non-filter-tip cigarettes[314] when about 32 mm remain, with 95% of the discards ranging from 9 to 43 mm. Krasny has reviewed in more detail the combustion characteristics of cigarettes[1859].

Unlike cigarettes, cigars show much more brand variability. In general, it is considered that cigars do not continue burning to completion unless air is drawn through them, although this may not necessarily be true for all brands in the marketplace. The rate of burning[314] of cigars ranges between 1.8 and 3.8 mm min^{-1}. Left alone, a cigar will burn for 138 – 310 s before self-extinguishing. During that time, 5 – 11 mm will be burned. Some very old data on the temperatures measured in cigars[315] indicate values of 815 – 925°C when not being puffed; these are indistinguishable from cigarettes.

It may be surprising to realize that cigarettes, puffed or smoldering, are unable to ignite most mixtures of flammable gases in air, at least in laboratory tests. Strese[316] measured a wide variety of gas/air mixtures to determine which ones could and which ones could not be ignited by cigarettes. Ignition was obtained for:

acetylene	hydrogen
carbon disulfide	hydrogen sulfide
ethylene oxide	phosphine
diethyl ether	

Ignition was not obtained for:

acetone	ethylene
acrolein	*n*-heptane
ammonia	*n*-hexane
benzene	methane
butadiene	methanol
butane	methyl amine
butyl acetate	methyl chloride
butylene	methylene chloride
chlorotrifluoroethylene	*n*-octane
cyclohexane	*n*-pentane
cyclopropane	propane
dimethyl ether	iso-propanol
dimethyl amine	propylene
dioxane	propylene oxide
ethyl acetate	town gas
ethanol	trimethyl amine
ethyl amine	vinyl chloride

Strese observed that the fuels which do ignite from cigarettes all have MIE values less than about 0.08 mJ, while most of the gases which do not ignite have values which are higher. Ethylene (which does not ignite) and vinyl acetylene (not tested), however have values which are barely higher than those of ethylene oxide and hydrogen sulfide, which do ignite. Toluene appears to be borderline ignitable. In one set of tests[317], a single ignition of toluene was obtained with a puffed cigarette, but further trials gave negative results. Hards[318] conducted tests where he was able to ignite diethyl ether from cigarettes, but not butane, pentane or propane. Nii[319] showed that diethyl ether and carbon disulfide vapors are readily ignited by cigarettes, especially if the burning end separates and falls into the flammable volume. For diethyl ether, the highest fraction of ignitions was achieved at a vapor concentration of ca. 12% and it proved impossible to ignite mixtures of 7% concentration or less.

Several papers report that gasoline vapors are not ignited in cigarette tests[310,317,320]. A number of theories have been proposed why ignitions do not take place when a cigarette is introduced into a flammable gasoline/air mixture. These include the highly oxygen-depleted conditions in the hot zone, and the 'flame arrester' action of the ash layer[310]. Perhaps most germane is the relation shown in Figure 71 in Chapter 4. In the cigarette, the zone where temperatures over, say 800°C, exist is only about 2 mm in size. For such tiny heated areas, very high temperatures are required, more than 1000°C, and these temperatures are more than can be achieved by glowing in the cigarette. For a puffed cigarette, the high temperatures are further counteracted by the very short time that the gases are in contact with the combustion area. If the residence times of the gases is estimated[310] as 1 ms, then only gas mixtures with an induction period (for the appropriate temperature) of less than 1 ms would be prone to ignition. A limited amount of testing indicates that cigars behave the same way as cigarettes with respect to ignition of gases. Neither cigarettes nor cigars are able to ignite dust cloud explosions[506].

Concerning 'non-ignition' results, it must be kept in mind that all of the laboratory tests have entailed only modest numbers of trials and were not set up to explore a wide range of conditions. The test results clearly indicate that ignition of gasoline vapors by a cigarette would be a rare event, but it would be imprudent to assume that the possibility is categorically disproved. As Hards[318] noted: "With negative evidence of this kind one cannot be sure without performing an infinite number of experiments!" Even though often-cited results are that natural gas (largely methane) does not ignite from cigarettes[321], Bureau of Mines tests[315] showed that a cigarette *can* ignite a methane/air mixture, if a velocity of 5 m s^{-1} is present. Combustion in a cigarette is a smoldering process and, presumably, ignition occurs because the imposed air velocity raises the temperature of the smolder front. As shown in Figure 68 in Chapter 4, methane is more difficult to ignite than gasoline, so if methane/air mixtures can be ignited, it would be unreasonable to consider vapors of gasoline and other more-readily ignitable gases to be non-ignitable.

It appears that when a cigarette is *thrown* onto a concrete surface the likelihood of ignition gasoline vapors may be higher. DeHaan[322] reports conducting some trials where such throwing did not result in ignition of gasoline vapors.

However, fire cases have been litigated where this precise scenario has been identified as the cause of the fire. A specific case has also been described by Yallop[323], where a fire was ignited when a man dropped a cigarette near a bowl in which he was using gasoline as a solvent. As with all ignition, a probabilistic aspect must be considered, and it does not appear that DeHaan was able to conduct a large number of trials. Clearly, several aspects of combustion favor ignition in such cases: (1) a large supply of fresh oxygen quickly enters the oxygen-depleted smoldering zone of a cigarette, thereby raising the temperature of the combustion area; (2) the protective ash layer is knocked off and the hot central core is directly exposed to the atmosphere; and (3) a shower of multiple burning fragments often results. What is not in doubt is that matches or cigarette lighters used to light a cigarette can ignite gasoline, methane, and a whole host of other gas mixtures. Thus, in practical cases where a cigarette is considered as a likely ignition cause, the means used to ignite the cigarette itself must be given consideration.

DeHaan[324] suggests that ignitions of gases/vapors from cigarettes that are otherwise identified as 'non-ignitable' may be due to flareups in burning, occasioned by foreign matter in the cigarette. There has not been any study attempting to examine this possibility. A study of smoking-caused methane explosions in coal mines[315] suggests that such incidents are generally due to striking a match in a methane/air atmosphere, not simply due to bringing in an already-lit cigarette. Yallop reports[323] the fascinating information that stubbing cigarettes out on a block of TNT does not cause ignition of the TNT.

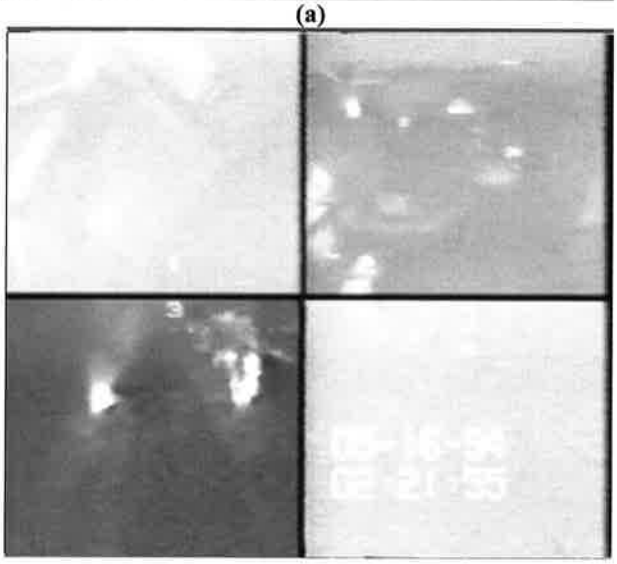
With all other factors held constant, a filter-tip cigarette is less likely to ignite a substrate than is a plain-tip cigarette. This was determined in a study[325] which examined the propensity for cigarettes to ignite wood shavings with a cross-wind of 0.75 – 1.0 m s^{-1}. This was attributed to a pulse of high temperature which results when the smolder front in cigarette reaches the butt; the pulse does not occur when a filter is present. The probability of ignition was also found to be dependent on the wind velocity, but this was not studied in detail.

The effectiveness of cigarettes as ignition sources for wastepaper baskets has been examined[326]. For wastebaskets filled with papers, snack wrappers, fast-food bags and polystyrene foam coffee cups, ignitions were not observed. Oily paper towels turned out to be ignitable, but out of a total of 300 tests of dropping cigarettes into wastebaskets, flaming occurred in only 5 instances; the times to flaming ranged from 14 to 18 minutes. A German study[327] provided more comprehensive results (Table 22), but the results were based on only 12 – 15 trials[328]. In fact, much longer ignition times have been observed in real fires. Figure 20 shows documentation of a fire that occurred due to cigarette disposal in a rubbish container. The time between the last human activity at the place of origin and the eruption of flam-

Table 22 Experimental times for flaming ignition to take place after placing a cigarette on a given substrate

Substrate	Time for ignition (min)		
	Min.	Avg.	Max.
corrugated cardboard	12	20	50
cotton	9	16	19
hay, straw	8	15	30
leaves, forest litter	12	46	68
paper	8	17	40

(a)



(b)

Figure 20 Ignition of a wastebasket due to cigarette disposal. **(a)** last human activity at the location of fire origin (lower-left frame: cleaner emptying ashtray contents into rubbish container). **(b)** eruption of flaming 3 h 12 min later. *(Courtesy John D. DeHaan and Washington State Police)*

ing was 192 minutes. Some additional research is discussed under *Paper products*.
In a study of comforters filled with feathers, down or polyester fibers, it was found that no ignitions from cigarettes occurred; in each case only local, non-progressive charring was found under the cigarette[329]. The covers tested included cellulosic, thermoplastic, and mixed-fiber fabrics. A computer model has been developed to simulate the ignition of soft furnishings by cigarettes[330]; however, it is a research tool and is not set up for the predictions of real-fire ignitions.

US Congress twice passed legislation to investigate the possibility of reducing cigarette ignitions of upholstered furniture and mattresses. Pursuant to this, NIST completed two major studies of test methods intended to qualify safer cigarettes; these are discussed under *Upholstered furniture*, as are other aspects of cigarette ignition of upholstered furniture and mattresses.

Burning of cigarettes is substantially more hazardous in oxygen-enriched atmospheres. Wharton[331] found that in atmospheres of 30% O_2 or higher, cigarettes flamed, not just smoldered, and burned up rapidly. At 40% O_2, it took only 8 to 9 s for a 50 mm length of cigarette to be consumed. When dipped in liquid oxygen, a cigarette burns like a flare.

Clothes irons

A clothes iron normally shows temperatures of 215°C or lower on its baseplate if no faults are involved and it is not put down upon an insulating surface[332]. The heating element is typically rated at 1100 W and clothes irons are so designed—unlike many other heat producing devices—that a 100% duty cycle will rapidly destroy it. If for some reason the thermostat fails, then a molten base plate (melting temperature ca. 550°C) can result[333]. The results of some simple testing on the propensity of clothes irons to set fire to clothing have been published[334]. The study examined the potential for ignition when an electric clothes iron (without an automatic shutoff feature) is placed face down on combustible clothing. A lightweight cotton fabric was used, placed over a cotton ironing-board cover, atop a foam pad. With an iron that had a properly functioning thermostat and thermal fuse protection, no fire resulted during a 168 h test, although substantial scorching resulted. When the thermostat and thermal fuse protection was bypassed, ignition occurred in about 16 min, with visible flaming first occurring on the bottom surface of the particle-board ironing board, then progressing upwards. Another study[335] found that, with a defective thermostat, a 1000 W iron reached a peak temperature of 740°C in 20 minutes; this is above the melting point of aluminum and the aluminum soleplate did melt out. A different ignition mode is involved when the power cord is damaged by contact with a hot iron surface.

CO_2 extinguishers

When a carbon dioxide extinguisher is discharged, whether fixed or a portable unit, the discharge comprises gaseous CO_2, particles of frozen CO_2, and both condensed and frozen water droplets (from atmospheric moisture). Due to collisions, the stream easily picks up an electrostatic charge. Thus, in a flammable atmosphere, a hazard can be created if an electrostatic discharge occurs. In 1966, such an ignition was the cause of an explosion on the tanker ALVA CAPE which was on fire after a collision took place and CO_2 was discharged for extinguishment. CO_2 discharge was also the cause of several disastrous tank explosions in Germany[336], with one of the cases involving 29 deaths[26].

Leonard and Clark[337] discharged hand-held 6.8 kg (15 lb) CO_2 extinguishers into a flammable, heptane/air atmosphere and obtained explosions in 2 out of 6 trials; tests also showed that charging voltages of 10 – 40 kV were being obtained. Haessler[338] measured up to 50 kV and a typical capacitance of 600 pF; the latter value appears to be very high, but details of experimental arrangements were not given. Up to 20 kV was found near the nozzle of a fixed CO_2 extinguishment system[339]. Butterworth[340] examined the electrostatic charging occurring with fixed, total-flooding CO_2 installations. He concluded that charging rates could be reduced by a factor of 20 – 50 by the implementation of a special discharge nozzle. The two essential traits of the nozzle were (1) non-metallic material, and (2) a sharp-edged orifice at the discharge tip, with no further downstream surfaces available to the flow. Another study explored the electrostatic fields associated with portable CO_2 extinguishers[341]. Maximum field strengths of about 0.6 MV m^{-1} were found, substantially lower than the breakdown value of 3 MV m^{-1}. The authors believe that a shock hazard exists, however, and that electrostatic ignitions are not precluded. In opposite conclusion as for the fixed-installation nozzles, for portable units, the authors found that a metallic discharge horn was helpful, and that a grounding wire included with plastic horns had no beneficial effect.

Coal

PROPERTIES OF COAL

The chemical composition of coal varies widely. Very roughly, coal comprises, by mass, about 80 – 90% carbon, 4 – 5% hydrogen, 3 – 11% oxygen, 1 – 3% nitrogen, 0.5 – 1% sulfur, and much smaller quantities of other elements. For bituminous coals, the percent of hydrogen and oxygen are at the high end, while for anthracite coals they are at the low end of the range. For many purposes, it is adequate to represent the effective formula of coal as $CH_{1.4}O_{0.6}$. A typical value of heat of combustion is 22 MJ kg^{-1} (upper) and 21 MJ kg^{-1} (lower). Coal may appear to be a solid substance, but in fact it is referred to as a "solid colloid"[342]. Its density is typically in the range of 1300 – 1500 kg m^{-3}, although it can range from below 1000 kg m^{-3} to over 2000 kg

Please note, in order to ensure timely delivery, this transcript was produced with the exhibits that were provided. At the time of production, we did not receive exhibit(s) 3 - 5 from the appropriate party.

Upon receipt of the exhibit(s), we will distribute under separate cover.